

Individual and Environmental Influences on Intake of Calcium-rich Food and Beverages by Young Hmong Adolescent Girls

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ABSTRACT

Objective: To identify individual and environmental factors affecting intake of calcium-rich food and beverages by early adolescent Hmong girls.

Design: Cross-sectional survey of girls, in-depth interviews with parents.

Setting: Girl Scout and 4-H programs in the Minneapolis/St. Paul metropolitan area.

Participants: Convenience samples of 10-13-year-old Hmong girls (n = 102) and their parents (n = 20).

Analysis: Spearman correlation analysis, constant comparative method.

Variables Measured: Individual and environmental factors for girls and reported intake of calcium-rich food and beverages.

Results: Few girls observed parents drinking milk or were encouraged by parents to drink milk. Many reported low intake of milk with dinner meals and snacks. Only one third reported that calcium-rich food such as yogurt, cheese, and tofu were available at home, and intake of these food items was associated with availability. Parents accommodated child preferences and had few expectations for their child to eat certain calcium-rich food items. Parents did not commonly consume dairy products but indicated they made milk available for children. Knowledge of calcium requirements was limited, but most parents related calcium to bone health.

Conclusions and Implications: Environmental factors may limit calcium intake by Hmong girls. Education should involve parents and children and address environmental factors that affect intake.

Key Words: Hmong, early adolescent girls, calcium intake, parental influence

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INTRODUCTION

By 2020, 1 in 2 Americans over the age of 50 is expected to have osteoporosis or be at risk of developing osteoporosis.¹ The age of peak bone mass, an important determinant of osteoporosis risk,² is estimated to be around 20 years of age, with the most rapid increase during early adolescence.³⁻⁴ Small differences of 5% to 10% in bone mass and bone mineral density (BMD) at maturity are thought to contribute to substantial differences in the incidence of osteoporotic fractures.⁵ Adequate calcium intake established early in life can reduce osteoporosis risk by maximizing adult

peak bone mass.⁶ Only 10% of girls 12-19 years old consume the recommended adequate intake for calcium.⁷

According to the National Osteoporosis Risk Assessment (NORA) study of postmenopausal women in the United States, Asian women had the lowest mean BMD T-score.⁸ Compared to 7.2% of white women, 10% of Asian women were osteoporotic. Factors such as inadequate calcium intake and lactose intolerance may increase the risk of osteoporosis for Asians. A cross-sectional survey showed that Asian male and female adolescents consumed about 300 mg of calcium less per day than whites.⁹ The difference in calcium intake between Asian and white adolescents was attributed to milk intake. Dairy food and ingredients provided 62% of the calcium consumed in the United States by 2- to 18-year-old boys and girls¹⁰; however, by age 10, approximately 80% of Asian children are lactose intolerant,¹¹ which may limit calcium intake. For Asian female youth ages 9-25, dairy food contributed only about half of the calcium, whereas breads and cereals, vegetables and legumes, restaurant dishes, and fruit were also sources.¹²

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The Hmong people are a unique subgroup of Asians based on cultural and religious beliefs and immigration background. Dietary habits, food sources of nutrients, and effects of acculturation on eating patterns have not been well documented in this subgroup. Hmong people living in the United States today came from Laos, and their ancestors were from southwestern China. In 1975, many Hmong refugees moved from Laos to Thailand. From 1976 to the present time, Hmong refugees have moved from Thailand to the United States, France, Australia, French Guyana, and Canada. According to U.S. census data from 2000, about 169 000 Hmong live in the United States, with most living in California (65 000), Minnesota (42 000) and Wisconsin (34 000).¹³ Eating habits of Hmong people have been described as including few dairy products.¹⁴ In a small-scale, cross-sectional study, Asian-American girls, of whom the majority was Hmong, consumed a significantly smaller amount of calcium compared to other girls.¹⁵ In an earlier study, mean calcium intake was estimated to be about 300 mg/day for nonpregnant and pregnant Hmong women (16-65 years of age),¹⁶ with many reporting that they did not like milk or cheese. Insufficient intake of calcium by female Hmong adolescents and adults warrants further study of ways to modify eating behaviors that impact calcium intake.

The Social Cognitive Theory (SCT)¹⁷ has been used to study the factors that influence dietary behaviors in adolescents and to develop strategies for nutrition interventions.^{15,18} The SCT postulates that individual, behavioral, and environmental factors continually interact in a reciprocal manner to influence dietary behavior.¹⁷ These factors exerted important influences on children's dietary behaviors regarding intake of dairy food and calcium, as shown in several studies.¹⁸⁻²¹ Self-efficacy for eating a calcium-rich diet significantly predicted calcium intake in female early adolescents.¹⁸ Nicklas suggested that lack of children's knowledge about calcium sources and how much calcium is needed influenced consumption of dairy food and calcium intake.¹⁹ The number of meals and snacks consumed per day was a significant predictor of total calcium intake by adolescent girls.²⁰ Intake of milk and soft drinks by girls (4-6 years old) was directly influenced by mothers' intake of the same beverages.²¹

Existing limited information indicates that the calcium intake of Hmong adolescents and women may be less than recommended. A better understanding of factors influencing calcium intake by Hmong girls is needed so that educational interventions can be developed for this group. Therefore, the purpose of this study was to identify individual and environmental factors associated with intake of calcium-rich food and beverages by early adolescent Hmong girls. The perspectives of both female early adolescents and parents were considered.

METHODS

Subjects

A convenience sample of girls ($n = 102$) was recruited from Hmong Girl Scout groups and a Hmong 4-H program in

Minneapolis and St. Paul, Minnesota through recruitment letters distributed to girls to take home to parents. The Girl Scout program is an after-school community program housed in elementary schools, whereas the 4-H program is housed in community sites. Small gifts such as pencils, stickers, and erasers were given to girls in return for participation in the study. A convenience sample of parents ($n = 20$) who indicated they were the primary person responsible for food acquisition and preparation for the child was recruited from the same Girl Scout program through personal invitation or by phone. All parent interviewees had a child who completed the questionnaire portion of this study; however, data from parents and children were not paired for analysis. Compensation of \$20.00 was given to each parent completing the interview. Informed consent and assent forms for parents and girls were provided in English and Hmong and were signed before participation. The University Institutional Review Board approved the use of human subjects in this research study.

Instruments

Child questionnaire. Preliminary focus groups were conducted with early adolescent Hmong girls ($n = 22$) based on methods used by Auld et al,²² and results were used to revise an existing motivator barrier questionnaire related to intake of calcium-rich food and beverages.²³ The original questionnaire was developed for Asian, Hispanic, and white early adolescents as part of a larger multistate research project involving 12 states. The original questionnaire included 68 motivator/barrier items using Likert-style, 5-point, agree-disagree scales with an additional "Do not know" response option. Subscales developed based on data collected by others using the original questionnaire were tested and shown to have acceptable test-retest reliability and internal consistency prior to revision for use in the current study (unpublished data).

The original questionnaire was modified for use with Hmong girls to reflect specific influences on calcium intake based on initial focus group interview results. Fifty-three original motivator barrier items were retained, whereas 15 were deleted and 18 new items added. New items addressed beverage preferences for meals containing traditional Hmong food, parent perceptions of the healthfulness of milk and relation to overweight, having milk in the home for younger siblings, availability and liking of soy products, and responsibility for choosing snacks and beverages. Items regarding the frequency of intake of calcium-rich food (milk with cereal, yogurt, pudding, cheese, dark green vegetables) and various beverages (soft drinks, milk, orange juice, soy milk) were included from a calcium food frequency questionnaire, which included both dairy and non-dairy sources of calcium.²⁴ The revised questionnaire was pilot tested with Hmong girls ($n = 5$) to establish face validity with this group. A Hmong nutritionist (first author) was responsible for conducting the focus group interviews and worked with the second author to revise the

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