

Diet- and Body Size-related Attitudes and Behaviors Associated with Vitamin Supplement Use in a Representative Sample of Fourth-grade Students in Texas

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ABSTRACT

Objective: To examine diet- and body size-related attitudes and behaviors associated with supplement use in a representative sample of fourth-grade students in Texas.

Design: Cross-sectional data from the School Physical Activity and Nutrition study, a probability-based sample of schoolchildren. Children completed a questionnaire that assessed supplement use, food choices, diet-related attitudes, and physical activity; height and weight were measured.

Setting: School classrooms.

Participants: Representative sample of fourth-grade students in Texas (n = 5967; mean age = 9.7 years standard error of the mean [SEM] = .03 years, 46% Hispanic, 11% African-American).

Main Outcome Measures: Previous day vitamin supplement consumption, diet- and body size-related attitudes, food choices, demographic factors, and physical activity.

Analysis: Multivariable logistic regression models, $P < .05$.

Results: The prevalence of supplement use was 29%. Supplement intake was associated with physical activity. Girls who used supplements were more likely to report positive body image and greater interest in trying new food. Relative to nonusers, supplement users were less likely to perceive that they always ate healthful food, although supplement use was associated with more healthful food choices in boys and girls ($P < .001$).

Conclusions and Implications: The widespread use of supplements and clustering of supplement use with healthful diet and greater physical activity in fourth graders suggest that supplement use be closely investigated in studies of diet-disease precursor relations and lifestyle factors in children.

Key Words: vitamin supplement use, elementary schoolchild, food choices, diet-related attitudes, multiethnic, probability-based sample, physical activity (*J Nutr Educ Behav.* 2009;41:95-102.)

INTRODUCTION

Dietary behavior during childhood impacts optimal growth and development and influences age-associated risk of chronic diseases/conditions, including cardiovascular disease,

type 2 diabetes, cancer, osteoporosis, and obesity.^{1,2} Dietary patterns of children can include food choices, breakfast and meal patterns, school meal participation,¹ dieting,³ and the use of vitamin and mineral supplements.⁴

Previous research indicates that vitamin supplement use is associated with healthful food choices among infants/toddlers,^{5,6} preschoolers,⁷ early elementary school-aged children,⁸ and adolescents.⁹⁻¹¹ However, to the authors' knowledge, no information exists on the relation between vitamin supplement use and food choices in population-based samples of older elementary schoolchildren in the United States, especially those populations with significant Latino and African-American representation.

Since vitamin supplements are purchased and offered to elementary schoolchildren by their parents, consumption of vitamin supplements by children can be viewed as part of the dietary and/or health environment for that child. Prior research has shown that vitamin supplement use in adults is associated with better food intake, increased physical activity, and better body image and

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dietary habits,^{4,12} but it is not known if this association is seen in elementary schoolchildren as well.

The purpose of the current study was to examine diet- and body size-related attitudes and behaviors associated with vitamin supplement use in a representative sample of fourth-grade elementary schoolchildren in Texas. With this research it can be determined if vitamin supplement use is associated with other environmental and intrapersonal factors, or if supplement use can be viewed as a separate construct. The conceptual framework for this article examines constructs from the Theory of Planned Behavior¹³ and the Social Ecological Model,¹⁴ such as intrapersonal behavioral (diet, physical activity), attitudinal (body image satisfaction, perceived healthfulness of diet, interest in trying new food), and sociodemographic (gender, race/ethnicity, socioeconomic status, overweight status) factors related to vitamin supplement use in children. We acknowledge that parental/environmental variables (role modeling of behaviors considered to be healthful, gate keeping regarding purchasing and offering vitamins to children, menu planning and shopping practices determining availability of healthful food, norms for taking vitamins) may also constitute important determinants of elementary schoolchildren's vitamin supplement use, diet-related attitudes, and food choices, as posited by the Social Ecological model.¹⁴ However, in this study, the authors focused on selected intrapersonal factors that may be related to vitamin supplement use in elementary schoolchildren.

METHODS

Study Design and Data Collection

The data used were cross-sectional data from the 2000-2002 School Physical Activity and Nutrition (SPAN) study, a 3-stage, probability-based sample of Texas schoolchildren.¹⁵ The first stage of sampling included the 11 Texas public health regions, with school districts and schools composing stages 2 and 3 of the sampling plan, respectively. The sampling frame consisted of all public schools, excluding charter, special education, and alternative schools,

in Texas. Schools were selected from urban center, urban/suburban, and rural school districts from each public health region.¹⁶

The school district classification as rural, suburban, or urban was based on Texas Education Agency designations and population sizes of the surrounding area. Economic disadvantage for schools was defined as the percentage of students eligible for the federal free and reduced-price school lunch program.¹⁷ Since most were neighborhood schools, the economically disadvantaged classification for the school was assigned to all children in that school.

School administrators were contacted for permission to collect data in schools identified, based on the sampling plan. All fourth graders in sampled schools were given the opportunity to participate in the study. During the classroom measurement session, an overview of the study and protocol-related instructions were provided to students. Research staff measured heights and weights of students. Administering the survey and measuring heights and weights took 45-60 minutes per 50 students.

Participants

Institutional Review Boards at the University of Texas Health Science Center at Houston and the Texas Department of State Health Services, as well as the participating school districts and individual schools, approved study protocols and questionnaires. Active or passive parental consent was obtained from the students depending on school district policy. Children completed assent forms prior to completing the questionnaire.

Instruments and Measures

The SPAN study questionnaire. The SPAN questionnaire, based on the School-Based Nutrition Monitoring (SBNM) student questionnaire,¹⁸⁻²⁰ was used to obtain information regarding demographic factors, vitamin and mineral supplement use, physical activity, diet- and body weight-related attitudes, and food choices. Vitamin supplement use, physical activity, television viewing, and food choices were assessed based on previous day

information to minimize difficulties faced by young children in recollecting and summarizing data related to extended time periods.^{19,21}

This instrument has been tested for cognitive understanding among elementary schoolchildren and was determined to be age appropriate.¹⁸ The questionnaire was available in English and Spanish; 93 surveys (1.5%) were administered in Spanish. Both English and Spanish versions had pictures to promote recall and recognition of items by children.¹⁹ Questionnaire data entry included quality control measures, such as examining for stray marks and perforations, prior to scanning. Missing data and ambiguous responses did not exceed 1%.¹⁵

Vitamin and mineral supplement use was assessed by questioning participants about previous day vitamin pill consumption. Two-hour test-retest reliability among fourth grade students demonstrated excellent stability for responses to the vitamin question (percentage agreement = 93.6%, $\kappa = 0.87$) (19). Focus group testing and cognitive interviews in a separate convenience sample of fourth graders indicated that at this grade level, children think of vitamin/mineral pills also as "vitamin pills."¹⁸ The scope of the term *supplement* in this paper is vitamin/mineral supplement and does not include other dietary supplements, such as herbal or alternative supplements.

Physical activity was estimated by querying whether during the previous day the child had engaged in any exercise that made his/her heart beat fast and that made breathing harder for at least 20 minutes (eg, basketball, jogging, swimming, fast bicycling, tennis). Reproducibility coefficients for this question were superior (percentage agreement = 92.3%, $\kappa = 0.71$).¹⁹ Television (TV) viewing was assessed according to the number of hours the student had watched TV or video movies the previous day (0, 1, 2, 3 or more hours) (percentage agreement = 87.3%, $\kappa = 0.82$).¹⁹ For purposes of analysis, previous day TV viewing was divided into 2 reported categories: 0-1 hour of TV and 2-3 hours or more.

Diet- and body weight-related attitudes evaluated included self-perceptions of body weight, willingness to

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