

## **Dietary Supplements and Health / Athletic performance**

**Cai MQ, Yan WY. Study on iron nutritional status in adolescence.** Biomed-Environ-Sci. 1990 Mar; 3(1): 113-9.

Abstract: A study on iron-deficiency anemia (IDA) in adolescence was conducted among 478 teen-age students in Shanghai. The study indicated that the intake of nutrients among the students was generally insufficient. The lack of protein, calcium, Vitamin A, Vitamin B1, and Vitamin B2 was more serious. The morbidities of IDA among male and female students were 15.8 and 32.6%, respectively, higher in the female group (P less than 0.01). The iron-deficiency sufferers among male and female students were 46.8 and 61.8%, respectively, also higher in the female group (P less than 0.01). The causes of IDA were analyzed by the method of stepwise regression. In a study of the effect of IDA on intelligence and physical development in adolescents, we found that there was no significant effect of IDA on intelligence quotient (IQ) and school performance. However, the speed and endurance capabilities of students of both sexes were correlated directly with hemoglobin level. In female students, the speed capability was correlated directly with the serum ferritin content. On the basis of these findings, a special 3-month school lunch program was initiated. The results indicate that a comprehensive, rational, and balanced diet is beneficial to hemoglobin, free erythrocyte porphyrin, and serum ferritin contents and improves adolescent development.

**Chamberlain JG. The possible role of long-chain, omega-3 fatty acids in human brain phylogeny.** Perspect-Biol-Med. 1996 Spring; 39(3): 436-45.

Abstract: I propose that one of the key factors in human encephalization was increased HUFA intake, especially long-chain, omega-3 fatty acids from aquatic and terrestrial meat source. This provided the needed neural membrane fluidity and transmitter/receptor functions for rapid acquisition of more advanced human traits and allowed the expansion of *H. erectus* into more northern climates. The human brain initially could build ecophenotypically, or adaptive/directed mutationally upon previously evolved mammalian sensor/motor structures, and could rapidly expand cognitive functions within a few million years; as more niches were invaded, more brain diversity was needed to guarantee reproductive success. The metabolically expensive and expanding brain was nutritionally and biochemically set, as it were, for rapid accommodation to tool making, rock throwing, culture language, electronics, and the eventual endless discussion and writings about the brain itself, the evolution of consciousness, and the mid-brain problem [107]. All of this fits, no matter which theory of human evolution one adheres to--i.e., out of Africa, multiregional, etc.--or even the precise fossil chronology [108]. This proposal, based as it is on known facts and certain assumptions appears logical, simple, and satisfying, but it may be wrong. Yet Charles Darwin himself would have approved, because as he so aptly said: false facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence do little harm for everyone takes a salutary pleasure in providing their falseness; and when this is done our path toward error is closed and the road to truth is often opened.

**Grunbaum, Jo Anne et. al. A Comprehensive Approach to School Health Program Needs Assessment.** Journal of School Health; v65 n2 p54-59 Feb 1995

ABSTRACT: Describes an approach to help school districts conduct needs assessment of school health programs, emphasizing injury, violence, smoking, substance use, sexual behavior, nutrition, and physical activity. Researchers surveyed students and district personnel, observed physical education classes, interviewed faculty, and analyzed school lunch menus. The approach proved feasible and valuable.

**Kim SH, Keen CL. Patterns of vitamin/mineral supplement usage by adolescents attending athletic high schools in Korea. Int J Sport Nutr 1999 Dec;9(4):391-405**

An excessive use of vitamin/mineral supplements is considered by many to be a common health problem. We surveyed 1,355 adolescent boys and girls attending athletic high schools in Korea for their usage patterns of vitamin/mineral supplements. The usage rate of the vitamin/mineral supplements was 35.8%. The most favored supplements were vitamin C, multivitamins, and calcium. The reasons most cited for taking supplements were "to recover from fatigue," and "to maintain health." Vitamin and mineral intakes occurred over a wide range; mean intake values were typically higher than the Korean RDA. Vitamins B1, B12 and C were consumed in very high amounts at 29.7, 17.9 and 11.1 times the Korean RDA, respectively. When the intakes of nutrients from supplements and diet were combined, it was observed that the intakes of niacin, folic acid, vitamin C, and iron exceeded levels that have been proposed as upper safe limits. The above data underscore the need to provide sound nutritional education to athletic adolescents and their coaches with respect to the use of vitamin/mineral supplements and the links between adequate diet, good health, and physical performance.

**Lozoff B, Jimenez E, Wolf AW. Long-term developmental outcome of infants with iron deficiency. N-Engl-J-Med. 1991 Sep 5; 325(10): 687-94.**

Abstract: BACKGROUND. Iron-deficiency anemia has been associated with lowered scores on tests of mental and motor development in infancy. However, the long-term developmental outcome of infants with iron deficiency is unknown, because developmental tests in infancy do not predict later intellectual functioning. METHODS. This study is a follow-up evaluation of a group of Costa Rican children whose iron status and treatment were documented in infancy. Eighty-five percent (163) of the 191 children in the original group underwent comprehensive clinical, nutritional, and psychoeducational assessments at five years of age. The developmental test battery consisted of the Wechsler Preschool and Primary Scale of Intelligence, the Spanish version of the Woodcock-Johnson Psycho-Educational Battery, the Beery Developmental Test of Visual-Motor Integration, the Goodenough-Harris Draw-a-Man Test, and the Bruininks-Oseretsky Test of Motor Proficiency. RESULTS. All the children had excellent hematologic status and growth at five years of age. However, children who had moderately severe iron-deficiency anemia as infants, with hemoglobin levels less than or equal to 100 g per liter, had lower scores on tests of mental and motor functioning at school entry than the rest of the children. Although these children also came from less socioeconomically advantaged homes, their test scores remained significantly lower than those of the other children after we controlled for a comprehensive set of background factors. For example, the mean (+/- SD) adjusted Woodcock-Johnson preschool cluster score for the children who had moderate anemia in infancy (n = 30) was 448.6 +/- 9.7, as compared with 452.9 +/- 9.2 for the rest of the children (n = 133) (P less than 0.01); the adjusted visual-motor integration score was 5.9 +/- 2.1, as compared with 6.7 +/- 2.3 (P less than 0.05). CONCLUSIONS. Children who have iron-deficiency anemia in infancy are at risk for long-lasting developmental disadvantage as compared with their peers with better iron status.

**National Centers for Disease Control and Prevention. Middle School Risk Behavior 1995 Survey Results. 1996**

ABSTRACT: The Youth Risk Behavior Survey (YRBS) Middle School Questionnaire, produced by the National Centers for Disease Control and Prevention, was administered for the first time in North Carolina in 1995. The survey monitored high-priority health-risk behaviors, including: (1) weapons and violence; (2) suicide-related behaviors; (3) vehicle safety; (4) tobacco, alcohol, and other drug use; and (5) nutrition and physical exercise. A total of 2,227 students from 53 public schools were surveyed. Results within the personal safety category showed that weapon use is predominantly a male activity, with 20 percent carrying weapons to school and 10 percent reporting having been threatened with or injured by weapons at school. Over 25 percent of students had considered suicide and 10 percent had

attempted suicide. Forty percent had ridden with someone who had been drinking alcohol, with the percentage increasing by grade. The majority did not wear helmets while riding bicycles. Concerning drug use, findings showed that 53 percent had smoked cigarettes. High smoking rates were found among minorities, males, and older students. Over half had drunk alcohol and 17 percent had used marijuana, with the percentage increasing by grade. Results concerning personal health revealed that about 25 percent consider themselves overweight but 40 percent are dieting, most of whom are females. Over 80 percent reported exercising or playing sports in the previous week in addition to attending physical education classes. Almost 80 percent reported AIDS education at school; 60 percent had discussed AIDS or HIV with parents or other family adults. (Contains 25 references.) (KDFB)

**O'Dea J. Rawstorne P. Consumption of dietary supplements and energy drinks by schoolchildren.** Medical Journal of Australia 2000 Oct 2;173(7):389.

**Sobal, Jeffery; Marquart, Leonard F. Vitamin/Mineral Supplement Use among High School Athletes.** Adolescence; v29 n116 p835-43 Win 1994.

ABSTRACT: Examined supplement use among 742 athletes. Thirty-eight percent used supplements with usage not differing by gender or grade in school. Those wishing to participate in college sports more often consumed supplements. Healthy growth, illness, and sports performance given as reasons for use. Parents, doctors, and coaches influenced usage. (RJM)

**Soewondo S. The effect of iron deficiency and mental stimulation on Indonesian children's cognitive performance and development.** Kobe-J-Med-Sci. 1995 Apr; 41(1-2): 1-17.

Abstract: Three studies conducted in Indonesia will be described. Soewondo (12) investigated the relation of iron deficiency and cognitive function and impact of iron supplementation on verbal intelligence, attention and concept learning among iron deficient children without anemia and iron deficient anemic children. Half of 176 children, aged 3-6 years, received elemental Fe for 8 weeks and the other half received placebo. There were significant changes from pre to post intervention evaluations in ferritin, transferrin saturation, free erythrocyte protoporphyrin, and hemoglobin in the iron deficient anemic children. Pre and post treatment psychological test data showed that iron deficiency anemia produced alterations in cognitive processes related to visual attention and concept acquisition. These alterations can be reversed with iron treatment. Idjradinata (4) assessed the impact of iron supplementation on iron deficient infant's mental and psychomotor development. Hundred twenty six subjects aged 12 to 18 month were randomly assigned to either iron treatment or placebo intervention. After 4 months of iron supplementation, the hemoglobin, ferritin and transferrin saturation changed significantly in the iron deficient infants. A developmental delay was observed in the iron deficient anemic infants before intervention and the conditions were reversed after 4 months of iron treatment. Soemiarti (8) examined the effectiveness of a training course given to mothers of children aged 12 to 24 month on the rearing environment and consequently to the child's development. The subjects were 69 mothers of 20-35 years old. The training lasted for 21 days by giving mothers training using the program "Ibu Maju Anak Bermutu". The rearing environment improved, also the child's mental and psychomotor development.

**Stang J, Story MT, Harnack L, Neumark-Sztainer D. Relationships between vitamin and mineral supplement use, dietary intake, and dietary adequacy among adolescents.** J Am Diet Assoc 2000 Aug;100(8):905-10.

OBJECTIVE: To examine patterns of supplement use among US adolescents and the relationship between supplement use and dietary intake and adequacy. DESIGN: Adolescents self-reported 2 days of food intake using the 24-hour recall method and supplement use during a personal interview conducted as part of the 1994 Continuing Survey of Food Intakes of Individuals (CSFII). SUBJECTS: A national sample of 423 adolescents included in the 1994 CSFII survey. STATISTICAL ANALYSIS: chi 2 analysis was used to determine which demographic factors were significantly related to patterns of supplement use. Weighted percentages of adolescents by category of supplement use for selected vitamins

and minerals (calcium; iron; zinc; folic acid; and vitamins A, B-6, C, and E) are presented. Relationships between dietary intake of macronutrients and vitamins and minerals among adolescents and supplement use were determined using a least-squares model of general linear regression. RESULTS: Approximately one-third of adolescents reported using supplements, with 15.6% of youth using them on a daily basis. The majority of supplement users reported taking multivitamins (N = 95; 65.5%) whereas only one-third of supplement users reported taking individual vitamins or minerals. Supplement use was found to vary by gender, household size, and US region of residence. Adolescents who reported using supplements had higher mean dietary intakes of most micronutrients and lower intakes of total and saturated fat than those who did not use supplements. More than one-third of adolescents had dietary intakes of vitamins A and E, calcium, and zinc that were < 75% of the US Recommended Dietary Allowance.

APPLICATIONS/CONCLUSIONS: The majority of US adolescents do not use vitamin or mineral supplements. Interestingly, adolescents who do use supplements, even on an infrequent basis, consume diets that are more nutrient-dense than those who do not use supplements. Dietary intakes of several micronutrients were inadequate among all adolescents in this study, regardless of supplement use status. There is a need to develop and implement programs aimed at improving the dietary intakes of US adolescents.

**Telford RD, Catchpole EA, Deakin V, Hahn AG, Plank AW. The effect of 7 to 8 months of vitamin/mineral supplementation on athletic performance. Int J Sport Nutr 1992 Jun;2(2):135-53**

The effect of vitamin and mineral supplementation was studied over 7 to 8 months of training and competition in 82 athletes from four sports: basketball, gymnastics, rowing, and swimming. Matched subgroups were formed and a double-blind design used, with subgroups being given either the supplementation or a placebo. All athletes were monitored to ensure that the recommended daily intakes (RDI) of vitamins and minerals were provided by diet alone. Sport-specific and some common tests of strength as well as aerobic and anaerobic fitness were performed. Coaches' assessment of improvement was also obtained. The only significant effect of supplementation was observed in the female basketball players, in which the supplementation was associated with increased body weight, skinfold sum, and jumping ability. A significant increase in skinfold sum was also demonstrated over the whole group as a result of supplementation. In general, however, this study provided little evidence of any effect of supplementation to athletic performance for athletes consuming the dietary RDIs. Publication Types: Clinical trial Controlled clinical trial

**U.S. Congress 102<sup>nd</sup>. Meeting the Goals: Collaborating for Youth. Hearing Before the Committee on Labor and Human Resources, United States Senate. One Hundred Second Congress, First Session. On Examining the Need To Provide Comprehensive Services To Youth To Help the Nation Meet the Education Goals of School Readiness, Dropout Prevention, Improved School Achievement, and Drug and Violence Free Schools and To Examine What the Federal Government Can Do To Support and Expand Social Service Programs for Youth. U.S. Government Printing Office, Superintendent of Documents, Congressional Sales Office, Washington, DC 20402. 1991**

ABSTRACT: A hearing before the U.S. Senate Committee on Labor and Human Resources examined the need for provision of comprehensive services to youth. Topics discussed included: (1) the provision of coordinated social services to students and families in schools; (2) school readiness; (3) dropout prevention; (4) improved school achievement; (5) drug- and violence-free schools; and (6) child health and nutrition. Statements were made by Chairman Kennedy and other senators, and by spokespersons for several social service programs. Programs included: (1) programs in New Jersey that bring social services into the schools; (2) programs in Arkansas that serve children and students; (3) the Dunbar Project, which provides an array of services to six schools in Baltimore, Maryland; (4) Joining Forces, a national effort to join students with appropriate social services; (5) New Beginnings, which provides integrated services for children and families in San Diego, California; (6) programs to assist students in Boston, Massachusetts; (7) YouthNet, a youth development collaboration established by 12 agencies in Kansas

City, Missouri; and (8) the Family Learning Center, a rural, comprehensive, secondary education program for teenage parents and their children and extended families in Leslie, Michigan.

**Waggoner, Jan E. Adolescents in Crisis: Implementing Carnegie Recommendations in Middle Level Teacher Education by Collaborating with Community Service Agencies.** Paper presented at the Annual Meeting of the Association of Teacher Educators, 75th, Detroit, MI, February 19-22, 1995. Carnegie Council on Adolescent Development; Illinois. 1995.

**ABSTRACT:** According to the Carnegie Council on Adolescent Development, young adolescents are felt to be far more at risk for self-destructive behaviors than ever before, and middle grades schools are failing to meet students' needs. As part of a plan for restructuring middle grades education, Illinois has created a middle school endorsement added to elementary or secondary teacher certification and has created a model for integrating health, education, and social services into middle level education. One of the university courses designed to meet requirements for the middle school endorsement involves inservice and preservice teachers in learning about basic issues in eight developmentally appropriate areas and embedding those issues within each subject of the regular curriculum. The eight areas include self-esteem, peer relationships, gangs and violence, loss (including death and dying), nutrition, sexual activity, alcohol/drugs/tobacco, and communicable diseases. For each topic, a representative from a community or social service agency presents critical information, and teams of class members devise interdisciplinary units. Appendices to this paper list groups involved in the restructuring process, health and social indicators for early adolescents, health data about students in grades 5 through 8, and a table of contents from a guide to the middle school endorsement course described. Contains five references.

**Walker SP, Grantham McGregor SM, Powell CA, Chang SM. Effects of growth restriction in early childhood on growth, IQ, and cognition at age 11 to 12 years and the benefits of nutritional supplementation and psychosocial stimulation.** *J-Pediatr.* 2000 Jul; 137(1): 36-41 2000.

**OBJECTIVES:** (1) To determine whether benefits to growth and cognition remain after intervention in growth-restricted children who received psychosocial stimulation and nutritional supplementation in early childhood. (2) To investigate the extent of the differences in IQ and cognition at age 11 to 12 years between growth-restricted and non-growth-restricted children. **STUDY DESIGN:** Growth-restricted and non-growth-restricted children were identified at age 9 to 24 months, at which time the growth-restricted children participated in a 2-year randomized trial of nutritional supplementation and psychosocial stimulation. Eight years after the interventions ended, the children's growth, IQ, and cognitive functions were measured. **RESULTS:** There were no significant benefits from supplementation to growth or cognition. Children who had received stimulation had higher scores on the Weschler Intelligence Scales for Children-Revised full-scale (IQ) and verbal scale and tests of vocabulary and reasoning (all  $P < .05$ ). The growth-restricted children had significantly lower scores than the non-growth-restricted children on 10 of 11 cognitive tests. **CONCLUSIONS:** Psychosocial stimulation had small but significant long-term benefits on cognition in growth-restricted children. Growth-restricted children had significantly poorer performance than non-growth-restricted children on a wide range of cognitive tests, supporting the conclusion that growth restriction has long-term functional consequences.

**Weissberg Roger P, Gullota, Thomas P, Hampton Robert L, Ryan Bruce A, Adams Gerald R. Enhancing Children's Wellness. Healthy Children 2010.** Issues in Children's and Families' Lives, Volume 8. The John & Kelly Hartman Series. Sage Publications Inc., 2455 Teller Road, Thousand Oaks, CA 91320. 1997

**ABSTRACT:** This volume consists of 10 chapters which emphasize the latest research and theories about family, school, and community prevention programs and health promotion programs to improve the health status of children during the next decade. The goal of the volume is to influence the nation's policies and practices regarding children's health by raising awareness about effective and theoretically based prevention programs and strategies. The chapters address issues of problem behaviors coupled with substance abuse, delinquency, and school failure; drug abuse prevention; unwanted pregnancy; AIDS;

violent and aggressive behavior; depression and suicide; and childhood injury. After a foreword by Seymour B. Sarason, the 10 articles are: (1) "Introduction and Overview: Let's Make 'Healthy Children 2010' a National Priority!" (Weissberg and Kuster); (2) "The Prevalence of Problem Behaviors: Implications for Programs" (Dryfoos); (3) "School-Based Drug Abuse Prevention Strategies: From Research to Policy and Practice" (Dusenbury and Falco); (4) "Preventing High-Risk Sexual Behavior, Sexually Transmitted Diseases, and Pregnancy Among Adolescents" (Sagrestano and Paikoff); (5) "Violence Prevention for the 21st Century" (Murray, Guerra, and Williams); (6) "Prevention of Depression" (Compas, Connor, and Wadsworth); (7) "Prevention of Youth Suicide" (Kalafat); (8) "Promoting Healthy Dietary Behaviors" (Perry, Story, and Lytle); (9) "Prevention and Control of Injuries" (Tuchfarber, Zins, and Jason); and (10) "Academic Performance and School Success: Sources and Consequences" (Hawkins). (SD)

**Yu SM, Kogan MD, Gergen P. Vitamin-mineral supplement use among preschool children in the United States. Pediatrics 1997 Nov;100(5):E4**

**OBJECTIVE:** To estimate the prevalence of recent supplement use in a national sample of preschool children and to examine the relationship of maternal and child characteristics, past maternal supplement use practices, familial, health services, and child health factors associated with supplement use.

**METHODS:** We used data on 8285 preschool children whose mothers were interviewed for the 1991 Longitudinal Follow-up to the 1988 National Maternal and Infant Health Survey. Data collection was conducted either by telephone or personal interview. The sample is representative of the estimated 3.8 million US born children in 1988 and alive in 1991. The outcome measures are whether the child was given any vitamin and mineral supplements at least 3 days a week in the 30 days before the interview and the type of supplement received. Statistical techniques included bivariate and weighted multiple logistic regression analysis. **RESULTS:** More than half of all US 3-year-olds (54.4%) were given some vitamin and mineral supplement. The most common supplements consumed were multivitamin-mineral with iron (59% of supplement users) and multivitamin-mineral without iron (26.4%). Children who received any supplements tended to have mothers who are non-Hispanic White, older, more educated, married, insured, receiving care from a private health care provider, have greater household income, and took supplements during pregnancy. Child health characteristics associated with supplement use included first birth order and having eating problems or poor appetites. **CONCLUSIONS:** More than half of US preschool children used vitamin and mineral supplements. The sociodemographic and health predictors identified for supplement use suggest that groups at risk for nonuse are likely the same groups whose circumstances may predispose a need for supplementation.