

The Impact of Nutrition on World Health: A Brief History and Update of Nutritional Diseases

OBJECTIVES/RATIONALE

Nutrition plays an important role in maintaining health and wellness. The student will research and describe the impact of nutrition on world health.

TEKS 121.4 1K

TAKS ELA 1, 3, 4, 5
Social Studies 2, 3, 5

KEY POINTS

- I. Global Nutrition
 - A. According to the World Health Organization, health is a critical component of world peace.
 - B. Nutrition is a critical component of health.
 - C. Therefore, in order to improve the chances of world peace, governments must become involved in improving global nutrition.
- II. Historical Review
 - A. 17th and 18th Century
 1. Malaria, cholera, measles, TB, diarrheal disease, pellagra, rickets, vitamin A deficiency → high morbidity and mortality rate in Europe
 2. “Population was growing greater than the ability of the earth to provide subsistence.” Thomas Walter Malthus, British economist, 1798
 3. Wells and springs used by the public must be inspected, rivers and lakes must be kept unpolluted, abundant and pure food necessary for health, breastfeeding of infants critical – Johann Peter Frank, 1790
 4. Statistical records of health problems, births, deaths, etc. important – William Petty, 1650
 1. Compulsory in England by 1836
 2. Statistics concerning infant mortality for districts → good indicator of overall health of district
 - B. 19th Century
 1. Movement of preventive medicine and public health
 2. Mortality rates highest in poor areas, lowest in wealthy areas
 3. Epidemics follow famine and are more virulent among the poor and the hungry – Louis Rene’ Villerme’
 4. Sanitation (drainage systems, removal of trash, improved water supply) could prevent illness and improve health – Edwin Chadwick, 1842

5. Overcrowding and deterioration of food, sanitation, and housing leads to disintegration of health
6. Prevention is better than remedies for the cure of diseases
7. Cholera outbreaks still occurring → contagion theory of disease being explored
8. Pasteur develops germ theory
9. Many organisms identified: anthrax, malaria, TB, cholera, streptococcus, staphylococcus, E. coli, leprosy, diphtheria, Yersinia
10. Strategies to control infectious diseases: report cases, isolate, and disinfect
11. Nutritional science began
 1. Distinction between nitrogenous and non-nitrogenous foods
 2. Proteins build body
 3. Carbohydrates and fats are fuel
 4. Improved nutrition → improves resistance to disease
 5. Specific diets recommended for specific disorders
 6. Education of mothers concerning breastfeeding, promoting breastfeeding, improved prenatal care, testing of milk supply and pasteurization
12. Vitamin theory further developed in the last 25 years of the 19th century
 1. Treatment for scurvy, beriberi, night blindness, keratomalacia, rickets available in older medical literature
 2. Proof of cause and treatment for vitamin deficiency disorders developed

C. 20th Century

1. Vitamin theory: “unsuspected dietary factors” - Frederick Gowland Hopkins 1906
2. Beriberi, scurvy, pellagra are nutritional deficiency diseases – Casmir Funk, 1912
3. Nutritional immunology: relationship between nutrition and immunity → famine reduces resistance to disease
 1. Vitamin A: “anti-infective” vitamin, 1920’s
 2. FAO and WHO recommended studies on the relationship of nutritional status and resistance to parasites, 1950
4. Caloric intake in developed nations has continued to increase except among the poor working class

III. International Organizations

- A. Institut Pasteur, 1888
- B. Lister Institute, 1891
- C. Rockefeller Foundation
 1. Rockefeller Institute
 2. Rockefeller Sanitary Commission: to eradicate hookworm in the southern United States

3. International Health Commission, 1913: to expand hookworm control overseas; in 1920s expanded to include eradication of malaria, yellow fever, TB
 4. Transformed medicine in the United States to a technological approach
- D. National Institutes of Health
1. Hygienic Laboratory of the Marine Hospital Service, 1887: diagnosis of infectious diseases among immigrants
 2. Biologics Control Act of 1902 and Pure Food and Drugs Act of 1906
 3. Public health division became the U.S. Public Health Service in 1912: first investigations were of pellagra
 4. NIH formally established in 1930
- E. International d'Hygiene Publique (International Office of Public Health)
1. Formed in 1907
 2. Purpose: collect and distribute information on smallpox, plague, cholera, and other diseases
- F. Health Organization of the League of Nations – 1923 - Promotion of health, international standardization of biological tests and products, control of disease
- G. Food and Agriculture Organization 1945
1. Raising the levels of nutrition and standards of living
 2. Improving production and distribution of food and agricultural products
 3. Improving condition of rural populations
 4. International cooperation on nutrition, biodiversity, agricultural commodities
- H. Communicable Disease Center (CDC) in Atlanta, 1946
- I. United Nations International Children's Emergency Fund (UNICEF) – 1946
1. Protect the well-being of children
 2. Shipments of powdered milk, vaccinations, vector control, equipment for maternal and child health centers
 3. Improving community water supplies
- J. World Health Organization: 1948
1. Pan American Sanitary Bureau (regional office of WHO in 1949) → Pan American Health Organization (PAHO) in 1958
 2. Treatment campaigns
 3. Yaws, smallpox eradication, oral rehydration therapy, childhood immunizations
- IV. Nutritional Diseases Relating to World Health
- A. Kwashiorkor
1. Occurs mainly in children age 1-3
 2. Common in developing countries and in poverty stricken areas of developed countries
 3. Diets grossly deficient in protein

1. Protein-poor staple food
 2. Poor infant feeding practices
 3. Lack of protein rich food: meat, milk, fish, eggs, beans, etc
 4. Poor distribution of food in family
 5. Seasonal food shortages
 6. Poverty
 7. Cultural dietary practices
 8. Infections
 9. Ignorance or lack of knowledge of caregivers
4. Growth failure
 5. Wasting with edema
 6. Anorexia
 7. Edema: most important feature
 8. Mental changes: apathetic and disinterested, irritable
 9. Hair Changes
 10. Diarrhea
 11. Anemia
 12. Hepatomegaly
- B. Nutritional Marasmus
1. Most common in children under age of 1
 2. Form of starvation
 3. Lack of any kind of food
 4. Common cause: early cessation of breastfeeding
 5. Growth failure
 6. Wasting
 7. Appetite: ravenous
 8. Mental state: bright eyed and alert
 9. Anemia
 10. Diarrhea
 11. Protruding belly with thinness of the rest of the body
 12. No subcutaneous fat
- C. Iron Deficiency Anemia
- D. Xerophthalmia-Keratomalacia
1. Dietary deficiency of vitamin A
 2. Early sign: night blindness
 3. Drying of conjunctiva which spreads to cornea
 4. Leads to ulceration of eye
- E. Beriberi
1. Vitamin B₁ (thiamine) deficiency
 2. Common among rice-eating people of the world
 3. 3 types
 1. Wet beriberi: edema fluid in legs , scrotum, face, trunk; cardiac palpitations, chest pain, dyspnea; rapid deterioration, circulatory failure, death
 2. Dry beriberi: anesthesia/paresthesia of feet, muscular wasting, difficulty walking

3. Infantile beriberi: lack of thiamine in breast milk; dyspnea, cyanosis, cardiac failure, aphonia, convulsions
- F. Wernicke-Korsakoff Syndrome
1. Result of alcoholism induced thiamine deficiency
 2. Eye signs: nystagmus, diplopia, paralysis of external recti muscles, ataxia, mental psychoses
- G. Pellagra
1. Dietary deficiency of niacin
 2. Associated with corn (maize) diets
 3. Dermatitis, diarrhea, dementia, death
 4. Glossitis is early sign
 5. Skin lesions resemble sunburn or hyperpigmentation
- H. Scurvy
1. Vitamin C deficiency
 2. Extremity tenderness, muscle weakness
 3. Suppressed appetite
 4. Swollen, bleeding gums, loose teeth
 5. Petechial hemorrhages
 6. Delayed wound healing
 7. Anemia, SOB
 8. Infantile scurvy: much limb pain; “pithed frog” positioning
- I. Rickets-Osteomalacia
1. Vitamin D deficiency
 2. Soft, weak bone structure
 3. Diagnosis based on x-rays
 4. Deformities: pigeon chest, bowlegs, knock-knees, kyphosis
 5. Tetany can also result due to reduced serum calcium levels
 6. Rickets is seen in children; osteomalacia is in adults
 7. Osteomalacia: more common in women who have been depleted of calcium from multiple pregnancies and are protected from exposure to the sun
- J. Goiter
1. Iodine deficiency
 2. Endemic goiter areas usually far from the sea
 3. Benign enlargement of thyroid gland
 4. Causes cretinism in children

ACTIVITIES

- I. Research and report on a current event relating to lack of nutrients in a selected country.

MATERIALS NEEDED

Sources Used:

Nature, Vol. 414, December 2001, “Global and Societal Implications of the Diabetes Epidemic”

Journal of Pediatric Gastroenterology and Nutrition, 35:S224-S233, 35:S173-S179, August 2002, “The Political Environment: Effects on Growth and Development-Working Group Report of the First World Congress of Pediatric Gastroenterology, Hepatology, And Nutrition”, “ Malnutrition and Diarrhea: Working Group Report Of the First World Congress of Pediatric Gastroenterology, Hepatology, and Nutrition”

Journal of the American Dietetic Association, Vol. 100 Number 11, November 2000, “Solving Global Nutrition Challenges Required More Than New Biotechnologies”

Nutrition Reviews, Vol. 60 No. 5, May 2002, “CINI’s Approaches to Intervention: An Innovative Strategy to Combat Malnutrition in India”, “ Health and Nutrition in Women, Infants, and Children: Overview of the Global Situation and the Asian Enigma”

British Journal of Nutrition, 88, Suppl. 2, S139-S158, 2002, “ Global View on Functional Foods: Asian Perspectives”, “Global Views on Functional Foods: Latin American Perspective”, “Global View on Functional Foods: a US Perspective”

The World Health Report 2002 Reducing Risks, Promoting Healthy Lifestyles

The Nutrition Transition: Diet and Disease in the Developing World, ed. Benjamin Caballero & Barry M. Popkin, 2002

Dying for Growth: Global Inequality and the Health of the Poor, ed. Jim Yong Kim, Joyce V. Millen, Alec Irwin, & John Gershman, 2000

Scope Manual on Nutrition, Michael C. Latham, M.D., Robert B. McGandy, M.D., Mary B. McCann, M.D., Fredrick J. Stare, M.D., 1972

A Colour Atlas and Text of Diet-Related Disorders, 2nd edition, Donald S. McLaren, 1992

Nutrition and Health in Developing Countries, ed. Richard D. Semba, M.D. & Martin W. Bloem, M.D.

ASSESSMENT

Oral Presentation Rubric

ACCOMMODATIONS

For reinforcement, the student will make a chart of nutritional disorders and identify lack of nutrients associated.

For enrichment, the student will interview a public health official concerning nutritional disorder in community.

REFLECTIONS
