

Malnutrition and GI Parasitology in the Community

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Malnutrition

The 'other end' of malnutrition

- ◆ An escalating global epidemic of overweight and obesity – “**globesity**” – is taking over many parts of the world. If immediate action is not taken, millions will suffer from an array of serious health disorders.
- ◆ Obesity is one of today's most blatantly visible – yet most neglected – public health problems. Paradoxically coexisting with **undernutrition**.

www.int/nut/index.htm

Protein Energy Malnutrition

- ◆ “Protein-energy malnutrition (PEM) is by far the most lethal form of malnutrition. Children are its most visible victims. Malnutrition, “the silent emergency,” is an accomplice in at least half of the 10.4 million child deaths each year. These young lives are prematurely – and needlessly – lost “

www.who.int/nut/index.htm
(9/2004)



Nine year old girl

Who is at Risk? Protein Energy Malnutrition

- ◆ People of impoverished countries
- ◆ seen in the midst of drought or political turmoil.
- ◆ However as many as 50% of elderly persons in nursing homes in the U.S. suffer from protein-calorie malnutrition.
- ◆ Children
- ◆ Pregnant women

Micronutrient Deficiency

- ◆ Called "micronutrients" because they are needed in only miniscule amounts, these substances are the "magic wands" that enable the body to produce enzymes, hormones and other substances essential for proper growth and development.
- ◆ As tiny as the amounts are, the consequences of their absence are severe. Their lack represents a major threat to the health and development of populations the world over, particularly to preschool children and pregnant women in low-income countries.

Global Health Macronutrient Deficiency

- ◆ Iodine
- ◆ Vitamin A
- ◆ Iron

Vitamin A Deficiency

- ◆ Vitamin A deficiency causes night blindness and is the single most important cause of childhood blindness in developing countries. Every year, about 500,000 children lose their sight as a result of vitamin A deficiency. The majority (about 70%) die within one year of losing their sight.

Vitamin A Deficiency

- ◆ Vitamin A deficiency increases the risk of severe illness, and even death, from common childhood infections such as diarrheal diseases and measles. In developing countries 200–300 million children of preschool age are at risk of vitamin A deficiency.

Vitamin A Deficiency

- ◆ Vitamin A deficiency may increase the risk of maternal mortality in pregnant women. Nearly 600,000 women die from childbirth-related causes each year, the vast majority of them from complications which could be reduced through better nutrition, such as vitamin A.

Iron Deficiency

- ◆ "As many as 4–5 billion people, 66–80% of the world's population, may suffer from reduced learning ability and work capacity due to iron deficiency. More than 30% of the world's population, are anemic "*Battling iron deficiency anemia WHO 2002*

Iron Deficiency

- ◆ Iron deficiency impairs the cognitive development of children through to adolescence.

Iron Deficiency

- ◆ Iron deficiency damages immune mechanisms, and is associated with increased morbidity rates.

Iron Deficiency

- ◆ Iron deficiency impairs physical work capacity in men and women by up to 30%.

Iron Deficiency

- ◆ Iron deficiency during pregnancy is associated with multiple adverse outcomes for both mother and infant, including increased risk of sepsis, maternal mortality, perinatal mortality, and low birth weight.

Iron Deficiency

- ◆ Iron deficiency and anemia reduce learning ability and the work capacity of individuals and entire populations, bringing serious economic consequences and obstacles to national development.

Epidemiology of Iron Deficiency in the US

- ◆ prevalence of iron deficiency was greatest
 - toddlers aged 1--2 years (7%)
 - adolescent and adult females aged 12--49 years (9%--16%)
- ◆ The prevalence of iron deficiency was approximately two times higher among non-Hispanic black and Mexican-American females (19%--22%) than among non-Hispanic white females (10%).

www.cdc.gov (9/2004)

Manifestations of Iron Deficiency

- ◆ Pale skin (pale)
- ◆ Fatigue
- ◆ Irritability
- ◆ Weakness
- ◆ More . . .

Laboratory Findings in Iron Deficiency Anemia

- ◆ Low Hgb/Hct
- ◆ High RDW (microcytic cells)
- ◆ Follow up with iron studies
 - Low serum ferritin
 - Low serum iron
 - High TIBC

** Get a good history, rule out other cause for anemia ie. LEAD*

Preventing Iron Deficiency

- ◆ Iron is found in foods like red meat, egg yolks, and fortified flour, bread, and cereal
- ◆ Breast feeding & iron fortified formula
- ◆ Screening

Iodine Deficiency

- ◆ Iodine deficiency is the number one cause of preventable brain damage, affecting millions of people worldwide.

Assessment of Iodine Deficiency Disorders and Monitoring their Elimination: A Guide for Programme Managers 2nd edition.
WHO/UNICEF/ICCIDD 2001

Iodine Deficiency

- ◆ The problem of iodine deficiency is especially serious for pregnant women and young children. During pregnancy, even a mild deficiency of iodine can reduce brain development of the fetus limiting the intellectual ability of an individual for life.

Iodine Deficiency

- ◆ Iodine deficiency can cause severe mental and physical retardation, known as cretinism.

Iodine Deficiency

- ◆ Iodine deficiency in chronic form, can cause goiter (a disorder characterized by swelling of the thyroid gland) in both adults and children.

Iodine Deficiency

- ◆ Iodine deficiency most commonly, impedes fetal brain development. At the population level, the consequence of iodine deficiency is a 10–15% lower average intellectual quotient (IQ), which affects the social and economic development of both communities and nations.

Iodine Deficiency

- ◆ The World Bank has estimated that, combined with vitamin A deficiency and iron deficiency, iodine deficiency may lower the economic wealth of a nation by as much as 5% every year.

Case study:
Zacharia arrives in East Harlem

Manifestations of Iodine Deficiency

- ◆ Goiter-enlarged thyroid cells and gland
- ◆ Hypothyroidism: iodine is essential for the production of thyroid hormones and normal thyroid function
- ◆ Cretinism: physical and mental retardation

Manifestations of Iodine Deficiency

- ◆ Symptoms of hypothyroidism
 - Mental and physical sluggishness
 - Weakness
 - Fatigue
 - Cold intolerance
 - Weight gain
 - Depression
 - Many more . . .

Where is Iodine Deficiency?

- ◆ Land locked areas without iodized salt: Asia, Central Africa
- ◆ Endemic goiters occur within groups of people living in geographical areas with iron depleted soil

Laboratory Findings

- ◆ TSH high
- ◆ Thyroid hormones low (T3 and T4)

Preventing Iodine Deficiency?

- ◆ Iodized salt
- ◆ Seafood: fish and kelp
- ◆ Dairy products
- ◆ Plants grown in iodine rich soil

Folic Acid Deficiency

- ◆ An estimated 300,000 children are born each year with spina bifida and anencephaly, which are severe neural tube defects. Approximately 75%, 225,000, of these affected births could be prevented through increased consumption of synthetic folic acid by all women of reproductive age.

cdc.gov/nccdphp/dnpa/mmmpact/d
eficiencies.htm

Gastrointestinal Parasites (Often associated with malnutrition)

The Culprits

- ◆ *Ascaris lumbricoides* (Round worm)
- ◆ *Trichuris* (Whipworm)
- ◆ *Ancylostoma* (Necator, Hookworm)
- ◆ *Strongyloides*
- ◆ *Taenia* (beef or port tapeworm)
- ◆ *Giardia lamblia* (Giardia)
- ◆ *Entamoeba histolytica* (Ameba)

Signs and Symptoms of Intestinal Parasites

- ◆ Varied organisms cause similar symptoms
- ◆ Occasionally no symptoms
- ◆ Symptoms may be caused by presence of multiple organisms
- ◆ Malabsorption and diarrhea

Amebiasis

- ◆ Ingested in fecally contaminated water
- ◆ May be asymptomatic
- ◆ Diarrhea alternating with constipation
- ◆ Pain on defecation
- ◆ Some blood in stool
- ◆ Can cause liver abscess

Amebiasis Treatment

- ◆ Metronidazole
- ◆ Secnidazole

Giardia

- ◆ Foul smelling diarrhea associated with flatulence, abdominal pain, distention and anorexia
- ◆ Weight loss
- ◆ FTT
- ◆ Anemia

Giardia Treatment

- ◆ Furazolidone
- ◆ Metronidazole
- ◆ Secnidazole

Ascaris (Roundworm)

- ◆ Intermittent, no foul-smelling diarrhea
- ◆ Abdominal protrusion
- ◆ Pallor
- ◆ Weight loss
- ◆ Abdominal pain
- ◆ Poor appetite, malnutrition

Ascaris (Roundworm)

- ◆ Migratory
- ◆ Large parasite load can cause intestinal obstruction with migration of worms into the mouth and nose.
- ◆ Can cause persistent cough-
"Loeffler's Syndrome"

Ascaris Treatment

- ◆ Albendazole
- ◆ Mebendazole
- ◆ Piperazine

Hookworm

- ◆ Penetrates skin of hands and feet when touching contaminated earth or walking barefoot
- ◆ Stinging, burning, papulovesicular rash 1-2 weeks
- ◆ Abdominal pain
- ◆ Diarrhea
- ◆ Can cause rectal prolapse

Hookworm Treatment

- ◆ Mebendazole
- ◆ Albendazole
- ◆ *1 ounce ap of the higueron tree mixed with 1 ounce of milk and some honey*

Tapeworm

- ◆ Ingesting infected cow or pork
- ◆ Abdominal pain
- ◆ Hunger
- ◆ Weight loss
- ◆ Anemia
- ◆ Passage of flat white worm segments

Tapeworm Treatment

- ◆ Albendazole



Six year old boys



'Full grown' woman



Eleven year old boy

References

- ◆ www.who.org
- ◆ www.cdc.org
- ◆ The Stanford Guide to Antimicrobial Therapy
- ◆ AAP RedBook