

FISH AND HUMAN NUTRITION

INTRODUCTION

Fish makes a vital contribution to the survival and health of a significant portion of the world's population. Fish is especially important in the developing world. In some of Asia's poorest countries (Bangladesh, Cambodia) people derive as much as 75% of their daily protein from fish. In West Africa fish accounts for 30% of animal protein intake, and this number would be larger if the poor could afford to buy more.

Often referred to as "rich food for poor people," fish provides essential nourishment, especially quality proteins and fats (macronutrients), vitamins and minerals (micronutrients). Second, for those involved in fisheries, aquaculture and fish trade, fish is a source of income which can be used to purchase other additional food items. Though this brief emphasizes the former, fish contributes to food security as an important accompaniment to rice-based diets in Asia and maize- and cassava-based diets in Africa, though its consumption there is decreasing. Fish supply in Africa has been declining for a number of reasons while the demand has increased due to the rise in population. Strategies to increase fish supply are being promoted globally.

Malnutrition is still a problem in many countries particularly in Africa. It is estimated that 47 million children under five years old are stunted in sub-Saharan Africa whereas in eastern and southern Africa the figure stands at 24 million. Micronutrient deficiencies of vitamin A, iron and iodine are also of public health concern in the whole African region. Their consequences include nutritional blindness, poor learning capabilities, poor growth and increased morbidity and mortality rates. Development and agricultural programmes including fisheries and aquaculture which mainstream nutrition issues can go a long way in alleviating the problem of malnutrition in this part of the world as well as in other countries.

FISH AND MACRONUTRIENTS

Proteins

Proteins are important for growth and development of the body, maintenance and repairing of worn out tissues and for production of enzymes and hormones required for many body processes. The importance of fish in providing easily digested protein of high biological value is well documented. In the past this has served as a justification for promoting fisheries and aquaculture activities in several countries. On a fresh-weight basis, fish contains a good quantity of protein, about 18-20%, and contains all the eight essential amino acids including the sulphur-containing lysine, methionine, and cysteine. As most maize-based diets lack these compounds, rural households in Africa dependent on maize greatly benefit by increasing their fish consumption. Fish also complements cassava-based diets which are generally low in protein.

Fats

The fat content of fish varies depending on the species as well as the season but, in general, fish have less fat than red meats. The fat content ranges from 0.2% to 25%. However, fats from fatty fish species contain the polyunsaturated fatty acids (PUFAs) namely EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) (omega 3 fatty acids) which are essential for proper growth of children and are not associated with the occurrence of cardiovascular diseases such as coronary heart disease. In pregnant women, the presence of PUFAs in their diets has been associated with proper brain development among unborn babies. In other studies, omega 3 fatty acids have also been associated with reduced risk of preterm delivery and low birth weight. The fat also contributes to energy supplies and assists in the proper absorption of fat soluble vitamins namely A, D, E, and K.

FISH AND MICRONUTRIENTS

Vitamins

Fish is a rich source of vitamins, particularly vitamins A and D from fatty species, as well as thiamin, riboflavin and niacin (vitamins B₁, B₂ and B₃). Vitamin A from fish is more readily available to the body than from plant foods. Vitamin A is required for normal vision and for bone growth. Fatty fish contains more vitamin A than lean species. Studies have shown that mortality is reduced for children under five with a good vitamin A status. As sun drying destroys most of the available vitamin A better processing methods are required to preserve this vitamin.

Vitamin D present in fish liver and oils is crucial for bone growth since it is essential for the absorption and metabolism of calcium. Thiamin, niacin and riboflavin are important for energy metabolism. If eaten fresh, fish also contains a little vitamin C which is important for proper healing of wounds, normal health of body tissues and aids in the absorption of iron in the human body.

Minerals

The minerals present in fish include iron, calcium, zinc, iodine (from marine fish), phosphorus, selenium and fluorine. These minerals are highly 'bioavailable' meaning that they are easily absorbed by the body. Iron is important in the synthesis of hemoglobin in red blood cells which is important for transporting oxygen to all parts of the body. Iron deficiency is associated with anemia, impaired brain function and in infants is associated with poor learning ability and poor behavior. Due to its role in the immune system, its deficiency may also be associated with increased risk of infection.

Calcium is required for strong bones (formation and mineralization) and for the normal functioning of muscles and the nervous system. It is also important in the blood clotting process. Vitamin D is required for its proper absorption. The intake of calcium, phosphorus and fluorine is higher when small fish are eaten with their bones rather than when the fish bones are discarded. Deficiency of calcium may be associated with rickets in young children and osteomalacia (softening of bones) in adults and older people. Fluorine is also important for strong bones and teeth.

Zinc is required for most body processes as it occurs together with proteins in essential enzymes required for metabolism. Zinc plays an important role in growth and development as well in the proper functioning of the immune system and for a healthy skin. Zinc deficiency is associated with poor growth, skin problems and loss of hair among other problems.

Iodine, present in seafood, is important for hormones that regulate body metabolism and in children it is required for growth and normal mental development. A deficiency of iodine may lead to goiter (enlarged thyroid gland) and mental retardation in children.

It is evident that fish contribute more to people's diets than just the high quality protein they are so well known for. Fish should therefore be an integral component of the diet, preventing malnutrition by making these macro- and micro-nutrients readily available to the body.

FISH AND FEEDING YOUNG CHILDREN

Fish is soft, easy to cook and more easily digested than meat so even young children can be fed fish, contributing to improved nutrient intake. Fish can also be used as complementary foods especially in paste or powder form. These products can be used to enrich the maize- and cassava-based porridges that are normally consumed by young children in rural communities, especially in Africa. However, the challenge is to develop acceptable fishery products to use as complementary foods for young children as similar attempts failed in the 1980s and 1990s. Older children can consume fish without any problems and if well cooked they can benefit tremendously from the small fish that are such an excellent source of calcium and fluorine—elements crucial for the development of strong bones and teeth in the young.

FISH AND HIV/AIDS

The World Health Authority estimates that people living with HIV survive up to eight years longer if they have a good, varied diet. Not only is overall health improved, but the efficacy of antiretroviral drugs appears to be enhanced. Fish can contribute significantly to the nutritional regime of those living with HIV particularly in terms of the high quality protein and micronutrients that fish provide in a readily accessible form.

THE WAY FORWARD

Realizing the importance of fish to human nutrition, in addition to its role in reducing poverty and hunger, The WorldFish Center will be strengthening its aquaculture and fisheries programmes by mainstreaming nutrition in its community-based projects. This will ensure a greater impact by improving the nutritional status of households, particularly those with young children. Research will be undertaken to gain a better understanding of the role of fish in decreasing malnutrition and improving the health of the sick. This will also ensure that WorldFish Center programmes contribute to Millennium Development Goal 4 (reducing child mortality by two thirds by 2015) since high malnutrition levels are associated with increased child mortality rates.

D.M. Chilima, WorldFish Center, Zambia