

AIN SHAMS UNIVERSITY
INSTITUTE OF POST GRADUATE
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A PROTOCOL OF
THE RELATION BETWEEN NUTRITIONAL STATUS AND
EDUCATIONAL ATTAINMENT AMONG PRIMARY SCHOOL CHILDREN.

THESIS
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PART I

- **INTRODUCTION**
- **REVIEW OF LITERATURES**
- **AIM OF THE PRESENT WORK**
- **HYPOTHESIS**
- **MATERIAL AND METHOD**

INTRODUCTION

School children, being a vulnerable group passing through a critical period of physical and mental growth and development, are in need of special nutrition and health care. In developing countries, the nutritional and health status of school children are expected to suffer.

School children of today are actually the generation on whom social and economic progress of the whole nation will depend in the future. Consequently, if the nation is to ensure her future progress, success of the educational process of this generation must be guaranteed. Sound nutrition is closely related to educational progress; the poorer the nutrition, the more difficult it is for the child to benefit from education and school life. Therefore, every effort must be made to combat malnutrition among school children, various studies have shown that school children do not enjoy an optimum nutritional and health status, and the synergistic impact of malnutrition and infection, favoured by actively operating ecological factors, might constitute serious obstacles to their physical and mental development and their educational progress.

Approximately 10 million children under age 18 who come from families of low income levels suffer from problems

directly related to malnutrition (iron deficiency anemia, undernutrition, dental caries, etc). Malnutrition affects the physico-chemical pattern of the tissues, reduces the defensive capacity to environmental aggressions, lowers both the efficiency and the ability for work (Mayer, 1973).

There is no doubt that undernutrition and cultural deprivation are both associated with poor school achievement. Several studies pointed to the strong relation between malnutrition and poor school performance. Most prominent among these studies are those carried out by Klein and his colleagues, 1972, Werner and Muralidharan, 1970, and pollitt and his associates, 1982. For example, a study done by Dugdale in 1977 showed that there are strong associations between poor school performance on the one hand and nutritional and socioeconomic status on the other.

The aim of this work is to assess the nutritional status of a sample of primary school children, and to detect the magnitude of undernutrition among them, in an attempt to clarify the exact nature of the relation between malnutrition and educational attainment of those children.

In the light of the previous considerations, we can formulate the problem of the present study in the form of the following question:

"Is there any significant correlation between nutritional status and educational attainment of primary school children?"

NUTRITION AND GROWTH

Nutrition may be defined as the sum of processes by which an individual obtains, ingests, absorbs, and metabolizes those substances essential for life under all environmental circumstances (Dodge, 1975).

In other words nutrition can be considered the process whereby consumed food or other substances become part of the body. Food enables a person to grow, play, work, think, and perform many other functions that comprise life itself, without the energy supplied by food, no work or play could be accomplished and without food the body would not be able to build tissues necessary for growth and replacement of old cells (Angelis, 1976).

The energy requirements of an adult are dependant upon: physical activity, body size and composition, age and climate, and other ecological factors. The school child however must contend with an additional factor the nutrient needs for growth which are influenced by the velocity of the growth curve from six to eighteen years of age (McLaren, 1976).

Also, the energy needs of the body depend on the basal metabolism, the metabolism of food, growth and physical activity.

Energy is supplied by the three major food substances: fats, carbohydrates and proteins. Fats supply about nine calories per gram while carbohydrates and proteins each supply about four calories per gram (Young and Scrimshaw, 1979).

Proteins constitute about 18-19 percent of the total body weight of most individuals from age four to adulthood. It forms an integral part of the muscular, nervous, visceral and glandular tissues and of most body fluids and secretions. Among the many factors which influence the direction of protein metabolism in the body, the amino acids composition of the dietary protein; the adequacy of intakes of energy and other nutrients; and the nutritional status of the organism (Donald, 1976).

Proteins supply the body with amino acids which are necessary for growth and repair of tissue cells, solve for osmotic equilibrium, ions in acid-base balance and with prosthetic groups it forms hemoglobin, nucleoprotein, glycoprotein and lipoproteins.

Protein deficiency causes negative nitrogen balance, depletion of plasma proteins, lassitude, edema, abdominal

enlargement and protein malnutrition and or protein calorie malnutrition (Nelson, 1983). The daily requirement for protein varies with the amount of growth and repair occurring and table (1) shows the recommendations for children at each age from 4 to 14 years (McLaren, 1976).

Carbohydrates: are the major source of body energy. The metabolic requirements of a child per unit of body weight are higher than those of an adult, and structures like the brain and heart function only on glucose, for these reasons, a constant supply of carbohydrates must be ingested in food (Lowrey, 1978).

Carbohydrates supply 25-55 % of calories, they are readily available source of energy, necessary for structure of cells, antibodies, source of stored calories (glycogen and fat) as well can be converted to fat (Harper, 1977).

Fats: are the concentrated source of energy and vehicle for fat soluble vitamins. They help in physical protection for vessels, nerves, organs, insulation against changes in temperature, structure of body tissues, cell membranes and nuclei, vehicle for absorption of vitamins (A, D, E and K), aid satiety and delay emptying time of stomach, so its deficiency leads to lack of satiety beside underweight and skin changes due to low intake of essential fatty acids.

Requirements of fats are minimal and accurately not known, but fats usually supply 35 % of calories (Nelson, 1983).

Vitamins: are organic substances in food that are essential in small quantities and that function primarily as catalytic components of enzymatic systems, facilitating metabolic reactions, there are fat soluble vitamins (A, D, E and K) and water soluble vitamins (B complex group and ascorbic acid) (Donald, 1976).

Vitamin A: children are more apt to show poor vitamin A status than adults because the recommended are closely related to the rate of growth. It is important for vision, integrity of the epithelial structure and participates in the formation of bone matrix and teeth. Its deficiency leads to impairment of vision: night blindness, Xerosis of the conjunctiva and cornea, keratomalacia, Bitot's spots, photophobia. Also, vitamin A deficiency causes impaired epiphyseal bone formation; defective tooth enamel and follicular hyperkeratosis; retarded growth and mental retardation in infants (Dodge, 1975).

Vitamin D: regulates absorption and deposition of calcium and phosphorus and regulates level of serum alkaline phosphatase. Its deficiency leads to rickets, tetany, poor growth and poor bone mineralization.

Vitamin E: is possibly related to muscle metabolism, erythrocyte fragility and regulates nucleic acid turnover.

Vitamin K: is necessary for prothrombin formation and, in turn, normal clotting, its deficiency leads to hemorrhagic manifestation (Mc Laren, 1976).

VITAMIN B Group:-

Vit. B₁ (thiamine): is involved in the process of nerve conduction and essential to membrane permeability during nerve excitation. Its deficiency causes beriberi, fatigue, emotional instability, headache, insomnia, polyneuritis, edema and cardiac failure (Grant, 1977).

Vit. B₂ (riboflavin): Its deficiency leads to photophobia, blurred vision, burning eyes, poor growth, fissuring of mouth corners and lesions of tongue and Lips.

Vit. B₃ (Niacin): deficiency leads to pellagra which is characterized by rough skin mainly on the exposed surfaces to seen as well as under pressure points. Gastro-intestinal tract disturbances in the form of vomiting and diarrhea commonly occur. Mental disturbances are not uncommon. These three vitamins all have recognized functions in energy metabolism, and for this reason, recommendation have been related

to those for energy intakes (Angelis; 1976) (Mertz, 1974).

Vit. B₆ (Pyridoxine): is involved in a large number of enzyme systems associated with nitrogen metabolism. Pyridoxine deficiency causes irritability, convulsions, anemia, seborrhea, glossitis, peripheral neuropathy and motor impairment.

Vit. B₁₂ (cyanocobalamin): is essential for maturation of red blood cells in bone marrow and it is involved in CNS metabolism. Its deficiency leads to pernicious anemia, peripheral neuropathy, hyperpigmentation of the skin and involuntary movement.

Folic acid: deficiency leads to megaloblastic anemia, glossitis and intestinal malabsorption (Nelson, 1983).

Vitamin C (ascorbic acid): is needed to prevent Scurvy, to replenish the amount metabolized daily and to maintain the body pool (donald, 1976).

Minerals: are essential components of body tissues and fluids. They must be replaced in the diet to provide for equilibrium and synthesis of new tissue. The elements of prime importance are calcium, chloride, magnesium, phosphorus, potassium, sodium, and sulphur. Trace minerals,