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CHILDHOOD STUDIES
MEDICAL AND PSYCHO-MEDICAL
DEPARTMENT

Growth hormone *Level*
IN.
Protein-calorie malnutrition

THESIS

submitted for partial fulfillment of master degree of childhood studies

BY

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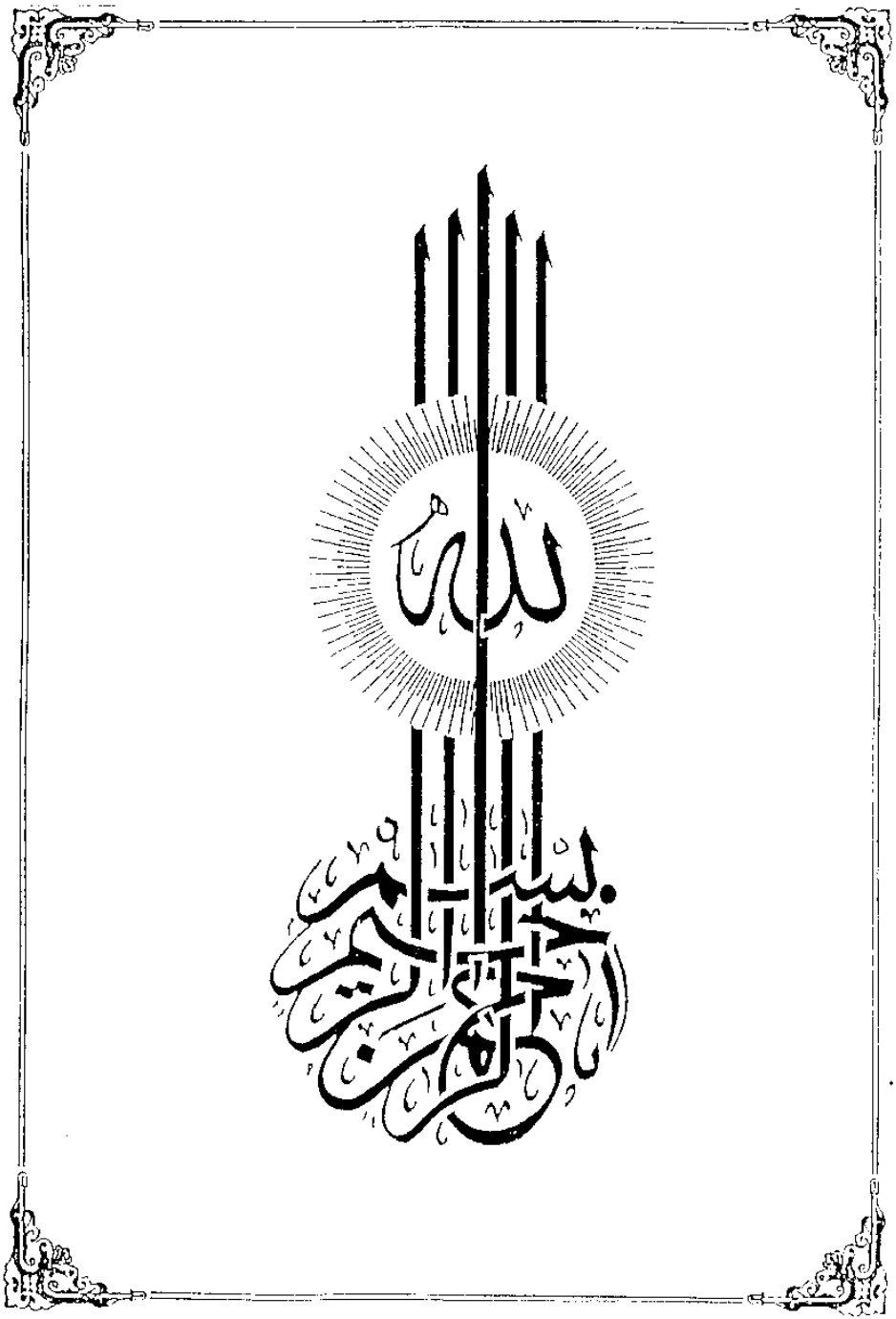

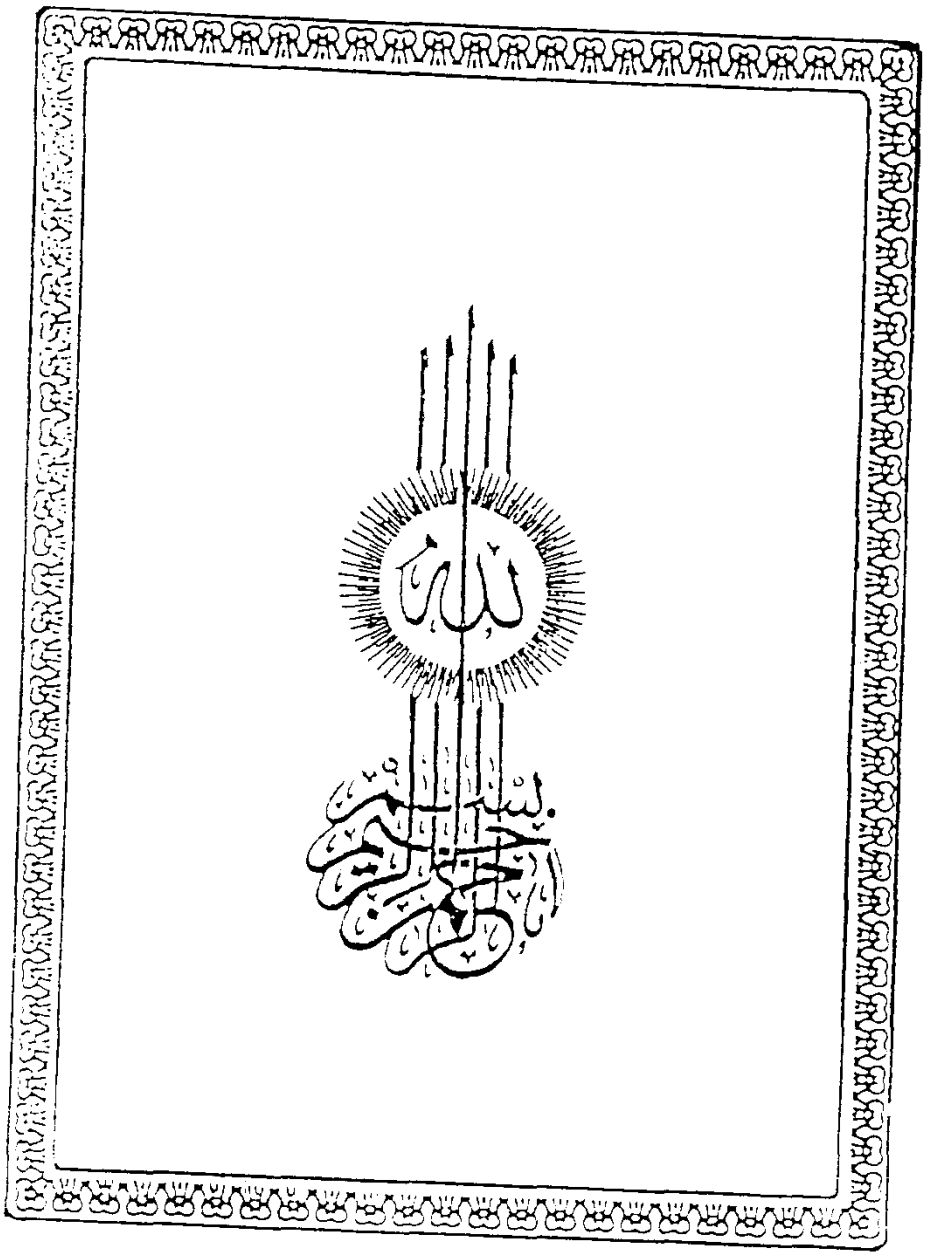

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PART I

INTRODUCTION AND AIM OF WORK

INTRODUCTION AND AIM OF WORK

Malnutrition entails undernutrition mostly and over-nutrition rarely.

Undernutrition is commonly encountered amongst poor or near-poor infants and young children in developing and under developed communities.

The classic forms of protein-calorie malnutrition (PCM) namely Kwashiorkor (Kwo) and marasmus are easily diagnosed clinically and have their rather characteristic Laboratory features.

A number of metabolic alternation are reported to occur in PCM. Since most of the metabolic processes in the body are under hormonal control, increasingly greater attention is being paid to study the hormonal status of malnourished children.

Our aim of work is concerned with the estimation of serum growth hormone in children suffering from protein-calorie malnutrition by using radio immuno assay method. The goal of the study is to highlight the problem and to provide the pediatrician and nutritionalist with some monitors that might help in the understanding the endocrinal effect on metabolic changes which occurs in PCM.

PART 2

REVIEW OF LITERATURE

CHAPTER ONE

nutrition

NUTRITION

Nutrition in early childhood.

Recommended intakes:

1. Dietary Fat.
2. Dietary Carbohydrates.
3. Dietary Proteins.
4. Vitamins.
5. Minerals.

Assessment of nutrition Status.

NUTRITION IN EARLY CHILDHOOD

The nutritional requirements of the youngs differ from those of adults for three reasons:

Firstly: all nutrients must be provided not only for energy and replacement of tissue but also for growth involving an increase in size of all tissues of the body.

Secondly: Many of the organs of the body have a functional capacity which differs from that of the adult and this is most marked in premature.

Thirdly: Most metabolic activities including nutritional requirements and drug dosage are more closely related to body surface area rather than any other simple measurement (Butler and Richie, 1960). The ratio of the surface area to weight or height decreases with increasing age, so that weight and height are not suitable basis for the determination of nutritional requirements except within a very limited age range.

Recommended Intakes

For any individual the desirable intake is that which satisfies his needs and allows for normal growth and normal activity (Burman, 1976).

The recommended intake of energy varies with age, it ranges from 120 calories per kg of body weight per day in the newborn to one third of this value for young healthy moderately active adults (Burman, 1976).

Carbohydrates, fats and proteins all contribute to energy content of the diet but in different degrees. The energy content of the food staffs are: 4 kcalories per gm of protein, 9 kcalories per gm of fat and 4 kcalories or 3.75 kcalories per gm of carbonydrates depending on whether carbohydrate is expressed as polysaccharides or monosaccharides (Who, 1973).

THE ENERGY IS REQUIRED FOR:

a) Basal metabolic rate: (BMR)

The basal metabolic rate in infancy when expressed in terms of surface area decreased with increasing age, thus reducing energy requirements. The brain accounts for 2/3 of the BMR in infancy but only a quarter in adult life when its contribution is equal to that of the liver and muscle. (Burman, 1976).

b) Specific dynamic action: (SDA)

The SDA is an increased heat production which results from 2 components. The first is the immediate effect which is due to increased activity of the organs responsible for digestion, absorption and transport of food. The second occurs later and is due to the waste heat produced by the conversion of food energy to high energy phosphate bonds when ADP is converted to ATP (Burman, 1976).

Specific dynamic action of food accounts for 5-10% of energy expenditure. Protein has a greater SDA than fats or carbohydrates (Krebs, 1964).

c) Energy of growth:

Growth requires energy and it has been established that 5 calories are needed for each gram of body weight gain (Who, 1973). It has been estimated that between a quarter (Who, 1973) and one third (Formon et al., 1971) of the total energy intake in the first few months of life is utilized for growth in this period.

1. DIETARY FATS:

Fats are essential for infant's nutrition in order to supply an adequate amount of energy. If fat was not used, the volume of feeds would need to be increased when energy requirements per unit weight are at their heighest. Substitution of fat as a source of energy with proteins would put an increased solute load upon the kidney and substitution with carbohydrates would lead to frequent digestive disturbances due to an excessive load on the disaccharidases of the intestinal mucosa (Burman, 1976).

Fats are also needed for making infant food palatable, and as a vehicle for fat soluble vitamins unless supplementation is carried out with water miscible forms

(Monkeberg, 1972). In practice, at least 20 percent of the diet should come from fat and in infants milks the figure varies from 35-50%.

Some of the fatty acids are called essential fatty acids because deficiency both in animals (Aaes Jorgensen, 1972) and in infants (Hansen et al., 1962) leads to growth retardation, skin changes with hair loss, increase in metabolic rate and early death.

The essential fatty acids are of 2 series. Linoleic acid and arachidonic acid are of the ω series. In infants deficiency symptoms will develop if less than 1% of energy is supplied by these essential fatty acids. Essential fatty acids are found in both cow's milk and human milk and are plentiful in most vegetable oils. Fish oil however contains very little of the essential fatty acids, although they are rich in other polyunsaturated fatty acids.

2. DIETARY CARBOHYDRATES:

Carbohydrates in the diet help to provide the energy requirements and act as a store of energy for the cell particularly the brain. Carbohydrates beside contributing to the energy pool, are also needed for synthesis of ribose in DNA via the pentose pathway (Burman, 1976). Glucose and galactose are incorporated directly into

cerebrosides and the glycoprotein fraction of collegen, ground substance and vascular membranes (Burman, 1976).

Sugars also play an important role in detoxication of ammonia and combating acidosis. A common method of detoxication is conjugation with glucuronic acid which is formed either from glucose or more rapidly in the newborn from galactose (Lestradet, 1972).

Early feeding with glucose and galactose is recommended in the newborn period in order to conjugate bilirubin, steriods and drugs such as chloramphenicol (Burman, 1976).

3. DIETARY PROTEINS:

Proteins are the major or the sole source of nitrogen in the body. Their real importance lies in the fact that every cell in the body is partly composed of proteins which are constantly subjected to wear and replacement (Munro & Allison, 1964).

Although dietary proteins are sources of energy in the body, yet they are normally less important in this respect than either carbohydrates or fats.

Whereas fats in the body can be derived from carbohydrates and carbohydrates from proteins, the proteins of the body are inevitably dependent for their maintainance on food proteins (Davidson, 1970). The amino group (NH) cannot be synthesized in man and therefore