PREVALENCE OF NAPKIN DERMATITIS IN THE NORMAL AND MALNOURISHED INFANTS AND CHILDREN

THESIS

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by

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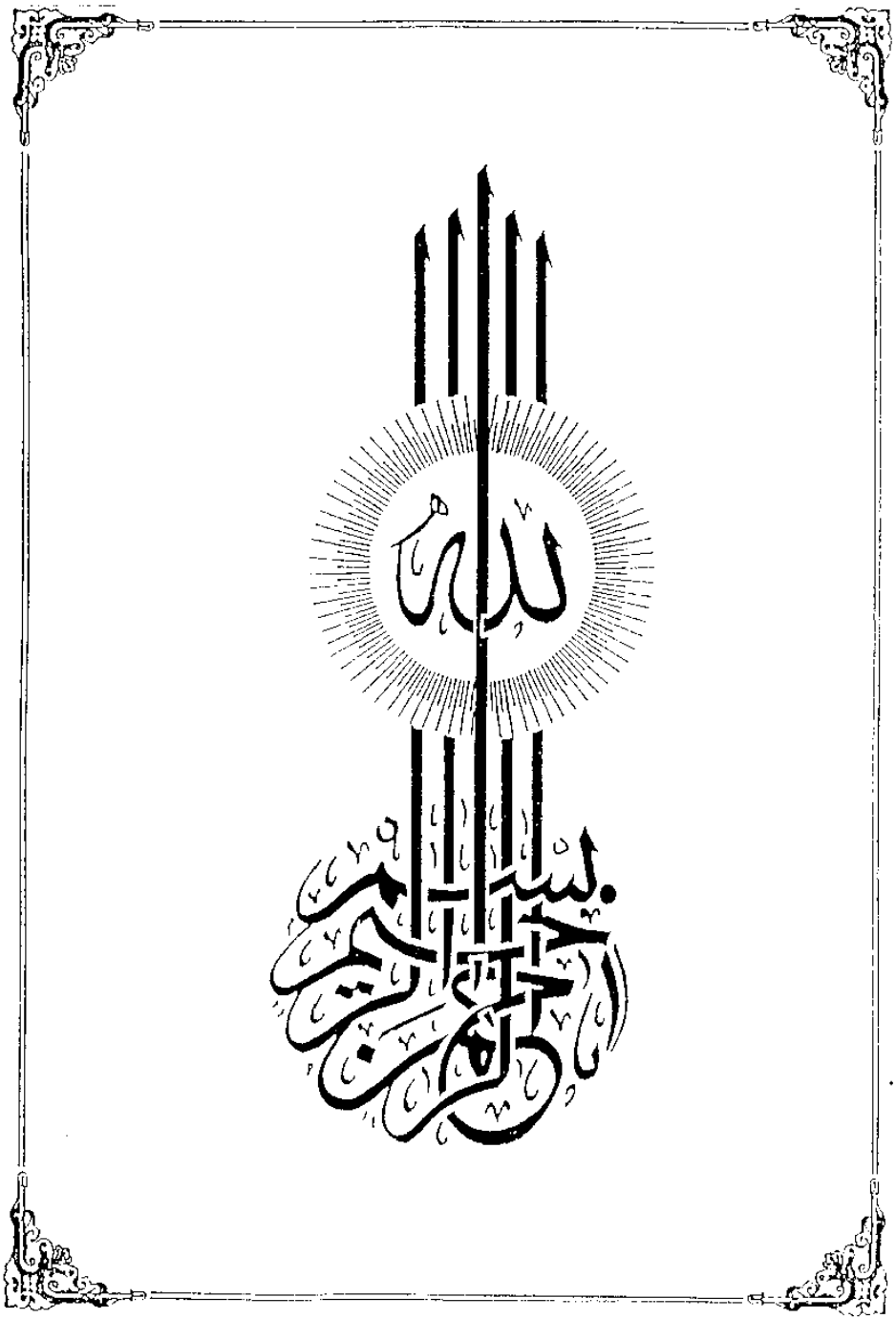

D e d i c a t e d

To

My Parents

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C O N T E N T S

INTRODUCTION AND AIM OF THE WORK

Napkin dermatitis stands as one of the most common problems that pediatricians meet during their practice, especially in children below 2 years of age. It is an inflammatory disorder induced by prolonged contact with urine, faeces or both. Occasionally, it is due to irritant chemicals contained in the napkin itself. It is commonly seen in children whose napkins are left wet for a long time without frequent changing, particularly in hot weather.

Protein Energy Malnutrition (PEM) is a composite of deficiencies of calories and many specific including proteins, minerals and vitamins. It is a well known predisposing factor to diaper dermatitis, especially caused by fungus infection because it alters the immune response by impairment of humoral immunity and significant suppression of T_lymphocytes.

Changes in the bioavailability of individual substances such as folic acid, iron, vitamin A or Zinc in P.E.M., lead also to alteration of the immune response.

Microbiological studies of diaper dermatitis have been few. The present work is planned to identify the infecting microorganisms in children with diaper dermatitis whether well-nourished or malnourished.

REVIEW OF LITERATURE

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SKIN OF THE NEONATES AND INFANTS

The skin allows the body to adapt to a wide variation in environment as it provides an extensive physical barrier. The stratum corneum is made up of many layers of horny plates that are relatively, but not absolutely, impermeable to fluids from outside. It also prevents evaporation of tissue fluids, though a small transepidermal waste is inevitable (Senddon, 1983).

The skin is composed of three structural compartments:

- Epidermis:

It forms the outer two layers of the skin derived from the embryological ectoderm. It is a many layered pavement of squamous epithelial cells (keratinocytes) devoid of blood vessels and nourished by a plexus of capillaries. In addition, it contains melanocytes derived from the neural crest and Langerhans cells derived from mesenchymal origin.

- Dermis:

It is derived from the mesoderm having its major constituent a fibrous protein called collagen, which is

embedded in a ground substance containing a high proportion of mucopolysaccharides. It also contains reticular fibres embedded in an amorphous ground substance, blood vessels, lymphatics, neural structures, eccrine and apocrine sweat glands, hair follicles, sebaceous glands and smooth muscles. The predominant cell is a spindle-shaped fibroblast that is responsible for the synthesis of collagen, elastic fibers and mucopolysaccharides. Phagocytic histiocytes, mast cells, and motile leukocytes are also present.

- Subcutaneous tissue:

It is very active metabolically and contains fat cells forming the stored lipids. The fibrous septa divide it into lobules. Blood vessels and nerves are also present. It serves as a storage depot of lipid, insulator to conserve body heat and protective cushion against trauma (Esterly, 1983).

The skin of the newborn differs from that of the adult as, in the newborn, the epidermis is thinner, particularly the transitional and keratinous layers rendering it more translucent and more elastic. A seemingly diminished adhesion between the epidermis and dermis increases the tendency towards extravasation of

SKIN METABOLISM WITH DIFFERENT NUTRIENTS

Diet has some influence on the chemical composition of the skin and thus on the cutaneous susceptibility to diseases. The changes in diet affect skin resistance to various external and internal stimuli (Urbach, 1964).

- Water metabolism:

In the skin as in other organs, the water level is largely dependent upon three factors: age, state of nutrition, and the possible presence of disease in the individual (Nadel, 1970).

Normally, the skin of infants and small children is extraordinarily rich in water, the healthy infant's skin contains 81-83% water, and as the child grows older, the organs normally contain lesser amount of water. This may be due to the changes in the physical and chemical characters of elastic and collagenic fibres of the cutis, incident to the old age (Urbach, 1964).

- Mineral metabolism:

Minerals maintain the osmotic pressure, enhance diffusion, regulate exchange of fluids among the cells and tissue juices and control the vasomotor tone and conductivity of the nervous system. So, the presence of

creases by an acid ash diet and decreases by an alkaline ash diet.

- Lipid metabolism:

Eckstein and Wile (1926) analysed the exfoliated scales of the normal skin and found that they contain higher cholesterol content (up to 1.5%) than that of the dermis (0.58 - 0.76%). The exposure to sunlight increases the cutaneous cholesterol content.

Urbach (1964) found that the skin cholesterol content in patients with seborrheic dermatitis was high.

- Protein metabolism:

Food protein is a mixture of amino-acids which split during digestion. Different amino-acids are essential for different species and ages (Urbach, 1964).

Twenty four amino-acids have been identified, nine of them have been found to be essential for infants: threonine, valine, leucine, isoleucine, lysine, tryptophan, phenylalanine, methionine and histidine. The principal protein components of the skin are the albumin, globulin, mucin, keratin, collagen and melanin (Wilson, 1928)

- Effect of vitamins on the skin:

Vitamins are organic substance which, in very minute amount, are necessary for proper function of the organism and which, in general must be obtained preformed from outside. The skin is a valuable guide in the recognition and diagnosis of the nutritional deficiencies. The skin has been found to exhibit the greatest evidence of vitamins deficiencies, particularly Vit. A, B_6 and niacin deficiency (Hansen et al., 1976).

Vitamin defiency causing dermatosis may be divided into a true deficiency or a relative one. This classification depends on whether the vitamin factor represents the decisive pathogenic element in dermatosis or it is just one of the essential elements in the pathogenic chain. Sometimes, it plays only a partial but not a decisive role (Urbach, 1964).

THE NORMAL FLORA OF THE SKIN

Normal skin is never sterile, and cannot be rendered so by any practical means. A variety of nitrogenous and lipoid materials make a good nidus for a luxuriant microflora on its surface and in the orifices of its specialized glands (Somerville, 1969).

Many kinds of bacteria may be recovered from the normal skin. Organisms from the gastrointestinal, genito-urinary and respiratory tracts are constantly being deposited on the skin together with the continuous contamination from many external sources (Montes and Wilborn, 1969).

Somerville (1969) distinguished between a transient and a resident microflora of the skin. Transient bacteria are derived from external sources, and they may accidentally contaminate the skin, particularly the exposed parts. These bacteria may lie free on the skin, or loosely attached by grease and other fats. The resident flora are quite different in character, as they are a relatively stable population, both in size and composition. This is due to the nature of the opposing forces constantly operating, some tending to increase, due to