CHROMOSOMAL ABERRATIONS IN PROTEIN-ENERGY MALNUTRITION IN CHILDREN

THESIS

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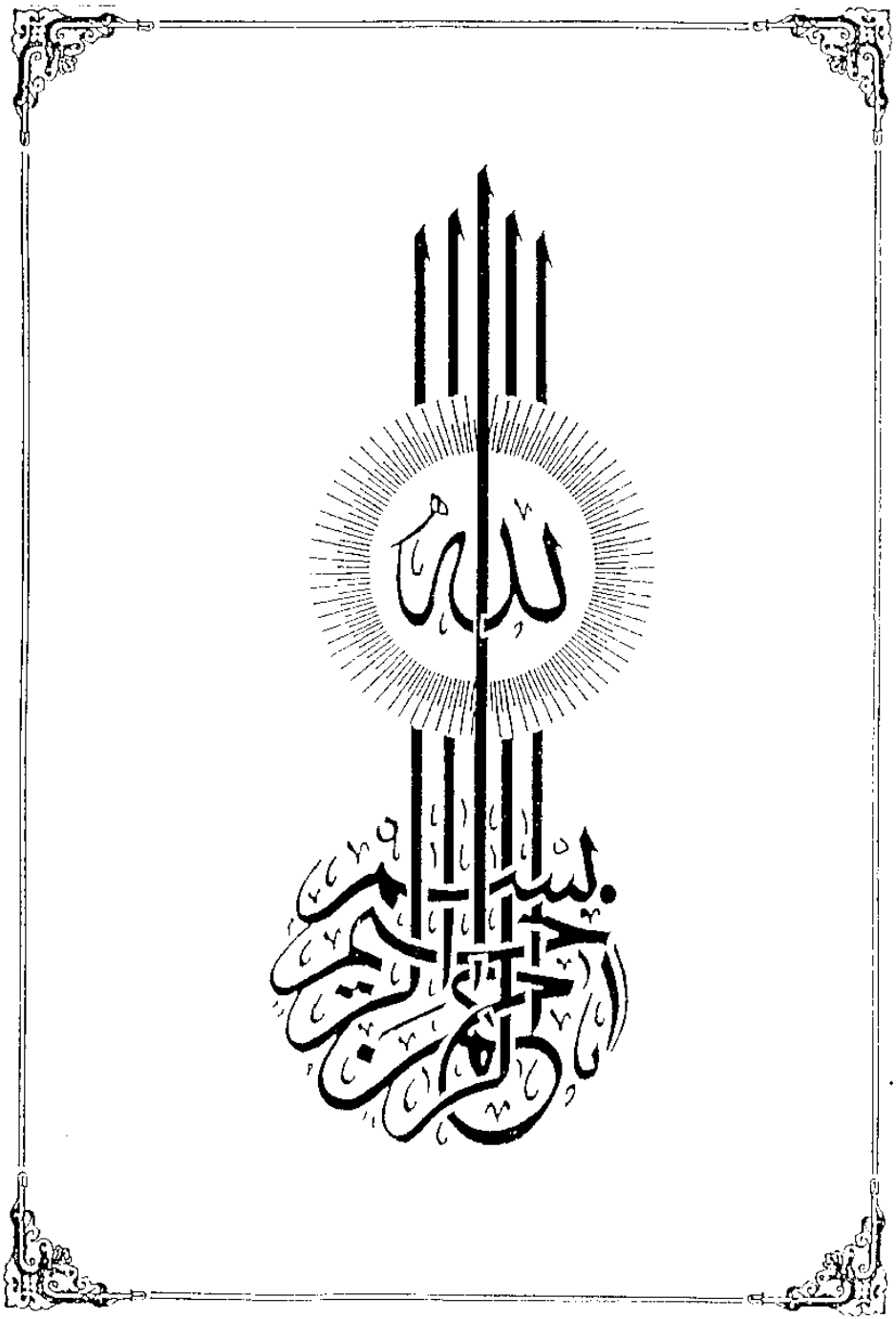

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INTRODUCTION

Protein energy malnutrition (P.E.M) is a widely spread disease especially in developing and poor countries in africa (Walt et al.,1950).

The primary cause is due to pure caloric starvation leading to marasmus, or it may be related to diet which may be reasonably adequate in total caloric value but is severely deficient in protein as kwashoirkor (Hutchison,1980).

Some studies have attempted to draw possible relationships between malnutrition and various indices of psychological development (Moodie , et al., 1980).

Others have attempted to identify aetiological agents, poverty most often being suggested as the chief cause (Lazarus and Bhana , 1985) .

In our country it is one of the serious health problems and major cause of death and disability . The mortality rate among preschool children in our country is about fourty times more than that of developed countries (Shukry et al., 1972).

There is evidence that D.N.A. replication and protein synthesis are affected in children with advanced P.C.M which suggest that in these circumstances cell division would

fail and chromosomes would become structurally abnormal , either spontaneously or as exagerated response to enviro-nmental factors such as ; radiation. chemical agents or viral infections . (Armendares et al., 1971 - Khouri and Mclaren, 1973.).

AIM OF THE WORK

Protein-caloric malnutrition is old and widely spread disease and its effects have been extensively investigated on clinical and biochemical levels but not for cytogenetic changes .

The aim of this work is to investigate and determine the chromosomal changes detected among infants and children suffering from protein - caloric malnutrition .

LITERATURE REVIEW

Literature Review

I- PEM :- Definition & Prevelance

Marasmus and Kwashiorkor (KWO), words originally used to describe clinical syndromes, have by convention, come to be used to define or classify severe childhood undernutrition (Welcome, 1970).

W H.O in(1970) defined P.E.M. as a range of pathological conditions arising from coincidant lack in varying proportions of proteins and calories occuring most frequently in infants and young children and commonly associated with infections .

P.C.M is epidemic in developing countries .Approximately 65% of the children under the age of 5 years in central america have weight deficits for age that suggest P.C.M,and over 50% of deaths in children under the age of 5 years in these countries have been linked to P C.M (Viteri , 1981) .

In developing countries the vast majority of children with P.C.M are malnourished because they do not eat enough food (Primary P.C.M) . It is increasingly recognized in industrialized nations that P.C.M occurs among patients with severe or chronic diseases (secondary P.C.M) (Merritt and suskind , 1979 - Mize etal.,1984).

However P.P.C.M. occurs in technically advanced countries as well, although its prevelance is unknown (Lazoff . and Faneroff , 1975 — John et al., 1977).

Recent commentary suggested that concern about chronic malnutrition in U.S.A. may be unfound (Graham ,1985).

Recent reports make it clear that severe P.P.C.M associated with poverty do exist in the U.S.A (Listernick et al., 1985).

William Bithoney testified before the house select commitee on hunger in washington D.C. (May 13, 1984) that 10 of 13 patients with 3rd degree malnutrition seen in his growth and nutrition clinic in Boston during one nine month period were poor .

Marasmus represents a relative change in body mass, less than 60% of the expected for age, a quantitative index, where as KWO denotes a qua litative change, the presence of pitting oedema, in which the loss of body weight may be variable in degree (Mosely and Chen , ,1984).

Caloric deprivation failure to thrive (C.D.F.T.T.) or nonorganic failure to thrive occurs when an infant is not fed enough, caloric deprivation causes growth failure . Failure to thrive 2ry to caloric deprivation is less common in children greater than 2 - 3 years old than in infants (Ellerstein and Barbara, 1985) .

Boland et al., 1986 believe that the use of the term nonorganic failure to thrive obscures the fact that treatable PEM is a common disorder and they highly recomend that this term should be discarded .

Aetiology of PEM

Undernutrition exists within a complex nexus of environmental factors with two major components to the aetiological framework : medical and social considerations (Mosley and Chen , 1984).

The two obviously interact, but it is useful to separate them because the skills, personnel and administrative machinery for handling them are usually separate . The social considerations may be reduced to those factors that affect the family's purchasing power its ability to provide food and gain access to satisfactroy health care . The solutions to social problems are often a politico-economic nature, embracing development aid, water and sanitation programmes, rural development, family planning, food subsidies. Of themselves considerations of this kind may only contribute something like 30% to explain the observed variance in nutritional state . (Mcleod ,1985).

The medical considerations relate to health in pregnancy the prevelance of low birth weight and speceefic problems related to infancy , especially respiratory infections and

diarrhoeal diseases (Jackson , 1986).

The majority of cases of KWO occur between 6-24 months. Few cases occur above 2 years and very few cases below 6 months of life (Gopalan, 1963).

Marasmus occurs in the Ist year of life while Marasmic-KWO occur in the Ist 2 years of life (Jellife,1959). So children between I-3 years are most exposed group .

Dynamics of undernutrition process :-

The children of poor communities, habitually subsisting on inadequate diets,There is continuous and insiduous transition from the stage of normalcy usually obtaining till about the fourth or sixth month (many infants being small for date may never start from normalcy), to that of full fledged clinically manifest undernutrition which generally supervenes before the third year. The speed of this downwords slide will depend on the extent of dietary inadequancy, its duration, and the presence or absence of superadded aggravating factors, like infection. In poor communities we may expect to see children in different stages of this transition. Not all the children will go through the entire transition; the down slide may be arrested at different stages or it may be so slow that the child may manage to cross the critical age period of 4 to 5 years before the end point is reached (Goplan , 1984).

It seems that there are several nutritional variables operating within the community that mediate in the nutritional status of young children . Such factors have not been given sufficient attention in the past. This may account for the observations by W.H.O workers that the mere provision of food does little to lower the incidence of malnutrition. (Lazarus and Bhana ,1985).

Classifications of P.E.M

I-Classifications depending on weight

In 1956 Gomez classified P.E.M into 3 grades depending on wt./ age as a percentage of expected weight.

Table -I- Gomez classification of wt/Age

% of Expected Wt/Age	Level of P.E.M
90%	Normal
89% - 75%	Ist degree
74% - 60%	2nd degree
60%	3rd degree