AN ESSAY ON DIARRHOEA IN PROTEIN ENERGY MALNUTRITION.

Thesis

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By

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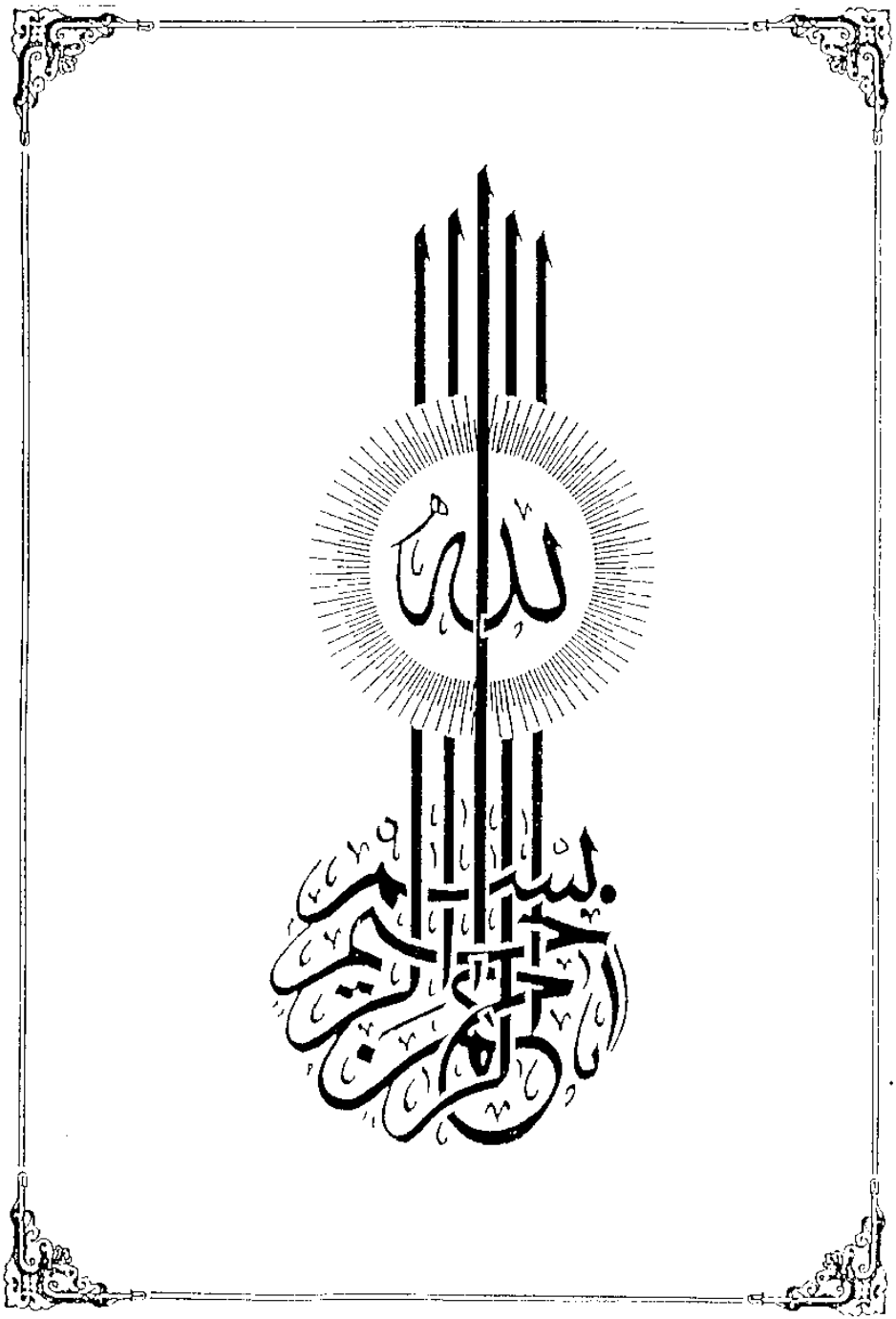

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Introduction

Protein energy malnutrition is one of the serious health problems in Egypt. (Shukry, et al. 1972). In a developing country, the mortality rate among preschool children which is an indirect evidence of the nutritional status is about 40 times more than that of developed country. (Abbassy, et al. 1972). This marked contrast is due to the difference in nutritional status among preschool children between developing and developed countries.

Hippocrates defined diarrhoea as an abnormal frequency and liquidity of fecal discharges. (Today this definition still holds). Diarrhoea is closely associated with malnutrition and it is described as an integral part of the clinical picture of Kwashiorkor(Trowell, et al. 1958).

In those areas of the world where malnutrition is prevelent, infantile diarrhoea presents a major pediatric and public health problem. A large percentage of infants and children presenting at hospital with diarrhoea have evidence of malnutrition.(Robertson, et al, 1960 and Kahn, 1961).

Jelliffe, (1966) considers that the "Big Three" among the killing diseases in childhood in developing countries are diarrhoeas, pneumonia and protein-energy-malnutrition of early childhood and that these diseases accounted for 21, 18 and 14 percent respectively of admission to the New Mulago Hospital in 1963.

In Egypt, diarrhoea is a common paediatric and public health problem, it is still the commonest cause of death during the first year of life. The infant mortality rate due to diarrhoea per thousand, in Egypt at 1965 was 52.9, at 1970 was 48.9 and at 1972 was 45.8 (Official Public Health Stistics, 1965, 1970, 1972):

The aim of this study is to write an essay about diarrhoea in protein-energy-malnutrition (P.E.M).

Review of literature will include:-

1- Prevalence of P.E.M.

2- Causes of diarrhoea in P.E.M.

3- Clinical features of diarrhoea in P.E.M.

4- Laboratory investigations.

5- Prevention and treatment.

Prevalence of Protein-Energy-Malnutrition

The prevelance of protein-energy-malnutrition in Egypt had been carried out in different field areas(Shukry, et al. 1972). According to Abd El-Hamid, et al.(1978),the prevalence of protein-energy-malnutrition was 26.45% which is markedly less than that reported by other investigators in rural areas. This situation may be related to the relatively better health services in the locality(Sendion Village , Qualyubeua Governorate),where the study was done, Also Abd El Hamid, et al. (1978)Showed that the prevalence of protein energy malnutrition was higher in females than males.

Other authors reported significant high prevelance of protein energy malnutrition among female children, and this was explained on the preferential situation of boys over girls particularly in rural areas(Dean, 1961). On the other hand El-Behary, et al, (1976) found that females were not more affected.

The prevalence of protein energy malnutrition was lowest during the first 6 months of life as showed by Abd El Hamid, et al.(1978) and this was related to the fact that breast feeding is the rule in this age period and is considered satisfactory from the nutritional point of view. Further more, there is no risk of contaminated bottle feeding with repeated attacks of diarrhoea which leads to malnutrition. On the other hand in the second 6 months of life the prevalence of protein energy malnutrition inc-

reased as breast milk was insufficient to meet all the dietary requirements and the supplements given were mostly watery fluids of negligible nutritional value.

Moreover these watery supplements increase the prevalence of diarrhoea. There is a close association between repeated diarrrhoea and protein energy malnutrition and this is explained by the nutritional state, infection, anorexia and deeply rooted habits of severe dietary restriction in such situation(Klelmann, et al. 1972 and Morley, 1973).

The highest prevalence of protein energy malnutrition was observed in the second year of life (Abd El Hamid, et al. 1978). This is due to the fact that children were mainly dependent on breast milk, particularly in the first year of life, but in the second year of life, breast milk becomes insufficient, in addition to the increased prevalence of diarrhoea which is another factor for malnutrition,

The outhors showed that by the end of the fourth year, the prevalence of protein energy malnutrition had markedly dropped,because most children are allowed to eat adult diet.

Shukry, et al. (1972) observed that the highest prevalence of protein energy malnutrition occurred in the second and third years and dropped markedly afterwards.

El-Behairy, et al.(1976) showed no relation between the prevalence of protein energy malnutrition and birth order and this was confirmed latter on by Abd El Hamid, et al (1978)/

In El-Salvador, Frederick, et al. (1979) ovserved that the levels of malnutrition in preschool children undergo ment significant seasonal changes with highest levels of malnutrition occuring in the early part of the rainy season. It seems likely that other tropical countries with similar economic and disease patterns related to rainy and dry seasons may also have comparable seasonal changes in the prevalence of malnutrition, the explanation of this is due to the low family income during the early part of the rainy season from May to July, where the lowest levels of employment are encountered between the end of the harvest in February and the beginning of the next planting season in July. The authors noticed that the seasonal pattern of the disease are commonly observed in relation to the onset of rains in May or June, at which time diarrhoeal diseases, respiratory diseases and malaria commonly increased.

It appears that seasonal changes in the prevalence of malnutrition are related to the occurance of diarrhoeal diseases. On the national level the peak of malnutrition incidence consistently followed the peak of diarrhoea(Scrimshow,et al. 1968 and Mata, et al. 1977).

A Simillar association between diarrhoea and kwashiorkor during the signle rainy season in a Bantu population in South Africa was reported by Waldmann(1973).
Pigott, et al. (1979) studied the enviromental factors and their effect on the nutritional status of 62 preschcol Guat-

emalan children and they found that about 50% of the children had mild protein-energy-malnutrition.

They added also that: the age at which first supplementary food was given, the number of living children in the family and the intergestational period before the subject's birth, all these factors help to predict the nutritional status of those children.

Jelliffe(1966) considered that the" big Three" among the killing diseases in childhood in developing countries are diarrhoeas, Pneumonia and protein-calorie malnutrition of early childhood and that these diseases accounted for 21, 18 and 14% respectively of admission to the New-Mulago Hospital in 1963.

Chen (1974) considered that pneumonia and diarrhoea are the major causes of toddler mortality in Malaysia. Similar Pattern of mortality and morbidity was seen in other developing countries such as Uganda and India(Cardozo, 1973 and Jelliffe, 1966).

The synergistic relationship between infection and malnutrition has been well documented. Scrimshow, et al. (1968) reported that infections precipitate nutritional diseases in the malnourished while malnutrition predisposes to infection and worsens the consequences of infection.

Taha, et al. (1978) studied the prevelance and severity of protein-calorie malnutrition in 1291 Sudanese children aged 6 months to 4 years, living in the Gezira. They found that only 47% of the children were well nourished while 1% of the remainder had severe PEM, 17 moderate PEM and 35% mild PEM. These data indicate that malnutrition is a grave pediatric problem in the Sudan.

Causes of Diarrhoea in protein-Energy-Malnutrition:-

Diarrhoea is a freqent presenting symptom in protein energy malnutrition and it is more common on the start of dietetic treatment. The pathogenesis of the diarrhoea is variable and several factors are considered. Enteric infections are important factors for such diarrhoea especially Salmonellae, Shigellae, E. Coli, Entemoeba histolytica and Giardia lamblia. On the other hand lactose intolerance seems to be an essential factor in addition to other disaccharides intolerance(Donald, et al. 1972).

The jejunal aspirates showed commonly the presence of candida albicans and unconjugated bile acids in those patients. All these factors in addition to grossly abnormal intestinal mucosa play a role in the pathogenesis of diarrhoea. However lactose intolerance and infection appear to be the most important (Donald, et al. 1972).

a- Infectious diarrhoea in protein enetgy malnutrition:-

Various types of bacterial agents may be the cause of diarrhoea in Egypt. The bacteriological etiology of diarrhoea varies from year to year and season to season. This may be due to the use of various anti-microbial drugs in treatment of diarrhoea, changes in the behaviour of various bacteria and the application of various selective media resulted in the isolation of different species of enterobacteriae which are newly isolated(Hablas, 1964 and Sanborn, et al. 1974)

The role played by all members of the pathogenic enterobacteriae causing diarrhoea in Egypt was studied by Mourad, et al. (1977). They found that Enteropathogenic Echerichia Coli were found in 28.5% of cases, Shigellae in 9.5% of cases, Bacillus proteus in 9.5% of cases and Klebsiella in 5% of cases while citrobacter; pseudomones Pyocyanea in 2% and 1% of cases respectively. salmonellae were found in 1.5% of cases.

Mourad, et al (1977) also reported that Escherichia coli; Shigella and Citrobacter were found in severe cases of diarrhoea especially in infants below one year. On the other hand, Bacillus proteus, Pseudomonas pyocyanea and Salmonella typhi were present more in children with mild or moderate diarrhoea. However Klebsiella caused variable degrees of diarrhoea in all age groups studied.

The association of certain types of Escherichia coli with infantile diarrhoea was first noted by Bahr, (1908) then other studies on Escherichia Coli started by kauffman (1954) for the seriological typing and for the presence of suitable antitoxic antisera by Gorbarth, et al. (1971).

Gorbarth, et al. (1972) identified the toxogenic and invasive strains. The High incidence of Enteropathogenic invasive strains. The high incidence of Enteropathogenic Escherichia coli as a cause of diarrhoea in Egyptian infants and children was reported by other workers(Aboul Dahab, et al. 1957 and El Falaky, et al. 1968).

Gorbarth, et al. (1972) stated that Escherichia Coli diarrhoea may present with Profuse watery diarrhoea and the organism colonizes, both the small and large intestine without producing any gross mucosal damage at the sites of multiplication of these organisms.

In the study carried by Mourad, et al .(1977) Shigella organisms were isolated from 9.5% of his cases as previously mentioned, infection by shigella flexeneri was commoner in infants below one year while shigella dysenteriae was predominant in older children, shigella sonnei and shigella dysenteriae were isolated from severe forms of diarrhoea.

Other workers reported a much higher incidence of shigella infection in Egyptian infants and children as Gorbarth, et al. (1972) and Sanborn; et al (1974).

Proteus was reported as a cause of out breaks of diarrhoea in infants(Shortland, 1968).

Awwaad, et al. (1971) mentioned that citrobacter is a cause of severe diarrhoea in Egyptian infants. Also they reported that Salmonella typhi as an uncommon cause of diarrhoea has also been reported as a cause of diarrheea in Egyptian infants and children. On the other hand Sehaffer, et al. (1948) and Henderson, et al. (1969) had believed that pseudomonas pyocyanea can cause severe gastro-enteritis in infants.

The malnourished children with diarrhoea had a very large number of bacteria in their jejunal contents while malnourished children without diarrhoea had a normal, sparse bacterial microflora as reported by Dammin, (1965).

Heyworth, et al. (1975) found that more than 10^5 bacteria per ml. in jejunal aspirates from 22 of 25 malnourished children studied in the Gambia.

Challacombe, et al. (1974) found that in 19, of 25 patients had total bacterial counts of over 10^4 per ml, a level which was significantly higher than that found in their small number of control subjects or in other well nourished infants and children without diarrhoea.

11- Lactose Intolerance Diarrhoea:-

Secondary carbodydrate intolerance was first recognized at the beginning of this century in infants with transient lactose intolerance following gastroenteritis(Finkelstein, et al. 1911) . A more prolonged and more severe illness was related to the presence of this complication which could be reduced when the offending carbohydrate (lactose) was eliminated from the diet.

In 1921, Howland classified infants with diarrhoea into those who had congenital difficulties with ingested carbohydrates, those with a temporary alteration following gastroenteritis and those with prolonged carbohydrate intolerance. subsequently it was shown that diarrhoea resulted from a deficiency of the enzymes necessary for hydrolysis of dietary disaccharides and that improvement occured only after the offending carbohydrate was eliminated from the diet(Halzel, et al. 1959) .

Lifshitz(1971),suggested that the alterations in the digestion and absorption of carbohydrates may lead to carbohydrate intolerance in patients of all age groups and this may be due to primary inborn alteration in the absorptive ability such as congenital lactase or,sucrase and, isomaltase deficiences or may be due to ethenic patterns of lactose malabsorption which affect the majority of the world's population such as ontogenetic lactase deficiency (Johnson, et al. 1974 and Newcomer, et al. 1978).