

Psychiatric Correlates of Undernutrition in Children Aged 9-11 Years in Port - Said City

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Malnutrition with its behavioral, psychological and intellectual sequelae are a major health problem in developing countries. In this study, the prevalence of malnutrition in a representative sample of school - age children (N=653) aged 9-11 years in Port-Said City was evaluated using the tenth percentile of the mean as the cut-off point for underweight and under height. The psychological status was assessed using the Johns Hopkins Depression Scale, behavioral problems using the Conners Parent-Teacher Hyperactivity Scale, and intellectual functioning using Mental Abilities Tests. Eighteen percent (N=117) were diagnosed as undernourished. Children, whether with chronic malnutrition or growth failure were significantly more likely to be depressed ($P<0.001$), to have significantly more behavioral problems ($P<0.001$) and to obtain lower ranges of I.Q compared to children with normal nutritional status. These results suggest that children with nutritional disadvantages who need nutritional rehabilitation should receive also psychiatric intervention.

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Introduction

Nutrition is the most important factor affecting growth and development of children especially in developing countries. Children suffering from malnutrition display clear delays in psychomotor and intellectual development (Stock and Smythe 1968). Children with nutritive deficiencies lasting three years or longer show a substantial lag in height and weight (Perkins, 1975). Malnourished children with reduced head circumference showed lower IQs than did adequately nourished children in control groups even after long term follow-up (Stock and Smythe, 1968).

Waterlow and Rutishauser (1974) suggested that children who are wasted or both stunted and wasted should receive the highest priority for nutrition inter-

vention. However, they stated that wasting is associated with impairment of mental development, which may be irreversible.

There are three major psychiatric sequelae of malnutrition in childhood, mainly intellectual or cognitive, behavioral, or social and emotional effects.

In the cognitive intellectual sphere, Dasen (1973) and Dasen et al., (1978) have reported that cognitive performance was highly correlated with weight and arm circumference, measures of current nutritional status, but not with height which measures prior nutritional status, of children aged 7-9 years who were moderately malnourished.

Other studies report significantly lower performance by malnourished children compared with adequately nourished children on cognitive tasks involving speed of perception, information processing, short-term memory, and sorting objects for size, colour, texture, form and complexity (Perkins, 1975).

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Galler and Ramsey (1987) have suggested that previous history of malnutrition have an effect on cognitive development in children even when the environmental factors improved. They also stated that the deficiency in performance in cognitive tasks are only partly associated with lower I.Q. in children below 14 years of age.

In a series of studies of school-children, Galler et al. (1983 a,b) demonstrated that a history of malnutrition in the first year of life is associated with a higher frequency of reduced I.Q. and impaired classroom behavior, notably attention deficit disorder. The impaired classroom behavior was associated with poor academic performance in seven out of eight school children and failure to be promoted to higher classes (Galler et al., 1984 a). The reduced I.Q. scores in previously malnourished children were correlated with slower performance on a series of five motor tasks (Galler et al., 1984 b). In contrast, physical growth and development in children aged from 5 to 11 years as measured by weight / height / age was not significantly reduced in previously malnourished children (Galler et al., 1983, c).

On the other hand, Richardson et al. (1978) have demonstrated that school boys with histories of malnutrition did not show evidence of developmental delay. In their study, a favorable environment fully compensated for I.Q. deficits in the index population, although Grant-ham McGregor and Stewart' (1980) failed to observe this relationship in a younger child population with documented infantile malnutrition.

However in a recent survey of two poor neighborhoods in Jamaica, Powell and Grantham - McGregor (1985) reported no direct relationship between environmental conditions and the child's developmental quotient, which was strongly associated with nutritional status.

Galler and Ramsey (1987) investigated performance on tests (Conservation Tasks) which assess the child's progress in learning conceptualization in school children, ages 9-15 years, with history of protein - energy malnutrition in the first year of life and their matched comparisons. Previously malnourished children below the age of 13 years or younger showed delays in performing conservation tasks. After age 14 this difference was no longer apparent, in contrast to persistent deficit in I.Q. in these same children. It was concluded that conservation task skills in this age group were sensitive to the effects of early malnutrition and that these were independent of I.Q. Moreover, Galler et al. (1986) showed that, at ages 5-11 and subsequently when the same children were again tested 4 years later, scores on the WISC-R were moderately impaired in association with early malnutrition and did not show any evidence of catch-up.

In addition to these relatively direct effects of malnutrition on learning are the effects of poor nutrition on psychosocial and emotional development in childhood. As regards the emotional and psychological impact of malnutrition, Ferholt et al. (1985) reported in an intensive longitudinal psychiatric study of very short children with severe growth failure that those children had marked depression, a personality disorder with narcissistic features and behavioral symptoms.

Behaviourally, the most common consequence was withdrawal, either into total isolation from peers (with or without increased interaction with adults) or in the form of preferential interaction with younger children. These withdrawal syndromes were typically accompanied by a lack of assertiveness and intense inferiority feelings. A number of those children establish the role of class clown, hypersensitiveness bordering on aggression, and other social inappropriate behaviors.

All the above findings emphasize the importance of past and current malnutrition as a factor in intellectual, behavioral and psychological development and well being of school - age children.

This study was designed to determine the prevalence of undernutrition among primary school children aged 9-11 years and its psychological, behavioral, and intellectual correlates.

Subjects and Method

653 primary school children aged 9-11 years, were randomly surveyed from the total pupils enlisted in the primary school system in Port-Said City (N=44934). The study sample investigated was recruited from the four educational sectors of the city and was proportional to the number of pupils in each sector. This was carried out through a stratified multistage cluster method by a simple random technique.

The permission and consent of educational authority was obtained and each child was interviewed and individually assessed through a semistructured interview to obtain the following data:

I. Sociodemographic information

II. Anthropometric measures.

1-Weight in Kilograms.

2- Height in Centimeters.

There are many anthropometric measures based on height alone or with weight for the assessment of nutritional status. However, weight and height in relation to age are the most commonly used measurements. Since growth retardation may be reflected by a reduction in both height and weight, weight for age is probably a better indicator of arrested development than is weight for height.

Waterlow (1972 & 1974) introduced a classification system based on the concepts of height for age and weight for height. Based on this classification children are classified as normal, Stunted (height deficit for age) stunted, wasted (weight deficient for height), or both

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stunted and and wasted. Short stature would, in a cross - sectional study, indicate past undernutrition or chronic existing undernutrition if it is accompanied by inadequate weight for height, it would lineate further the chronicity of the present undernutrition.

In 1976, a WHO/ FAO/ UNICEF expert committee on nutritional surveillance recommended the use of height for age and weight for height as an indicator of nutritional status in children. It considered height for age as an indicator of past or chronic undernutrition, and weight for height as an indicator of the present state of nutrition.

In the present study, children were classified according to weight height, and age into four groups (Waterlow, 1972)

1- Normal children.

2- Children with low heights for age and have a normal weight for height, are classified as stunted children having "chronic undernutrition"

3- Children whose both height for age and weight for height are below normal are classified as stunted and wasted children having "growth failure".

4- Children with normal height for age and low weight for height are classified as wasted children having "acute malnutrition".

III. Intellectual assessment:

Cognitive and intellectual functioning were assessed through the application of the Arabic version of the mental ability tests (Mousa, 1984). This test measures the general intellectual and academic abilities. It yields its score in the form of deviation intelligent quotient (D.I.Q).

The tests were administered individually and corrected and scored according to the manual.

IV- Psychiatric assessment:

The Johns Hopkins Depression scale (Joshi, et al., 1990) in its colloquial Arabic form was used to evaluate the

presence and severity of depression. This 38- item instrument was developed from criteria of DSM-III-R for the diagnosis of major depressive disorder. The diagnostic criteria were transformed into descriptions of depressive symptoms, using language and terminology that could be easily understood by children and adolescents. The assessment was carried out individually through structured interview. The item statements fall into five major symptom categories: mood, energy, behavior, somatic complaints, and vegetative symptoms. The items on the checklist are scored on a severity scale of 0 to 4. There are 10 items on the checklist which reflect depressive symptoms worded in the converse and hence are scored from 4 to 0 in order to determine consistency and validity of the assessments of individual raters, thus the maximum score on the checklist is 152 (38X4).

V- Behavioral assessment:

The Arabic version of the Conners Parent - Teacher Rating Scale which has been used widely in assessment and treatment studies of behavioral problems and attention deficit hyperactivity disorder and proved to be of high reliability and validity was applied (El-Defrawi et al.

1992). The checklist is composed of 10 items to be scored by the teacher and/or parent of the child on a scale from 0 to 4. The class teacher who was more familiar with the child was asked to rate the child as regard classroom behavior and functioning.

Chi-square statistical test was used to analyze the results

Results

653 Primary school - children, aged 9-11 years, were randomly sampled (315 girls and 338 boys). The mean height for boys aged 9 years =132 cm, aged 10 years =137cm, aged 11 years 142 cm, and for girls aged 9 years =130.9 cm, aged 10 years 136 cm, and aged 11 years =142 cm,. The mean weight for boys aged 9 years =24.4 kgm, aged 10 years =35 kgm, aged 11 years =39 kgm, aged girls aged 9 years =29.6 k gm, aged 10 years 33 kgm, and aged 11 years =38 kgm. 117 (17.9%) children were diagnosed as having nutritional problems. (60 boys or 51.3% and 57 girls or 48.7%). There was no significant difference between boys and girls 12 (10.2%) children (3 boys and 9 girls) were diagnosed as affected by acute undernutrition.

Table 1
The Relationship Between the Nutritional status and the Psychological Symptoms in studied Primary School Children Aged 9-11 years.

Psychological Status Nutritional Status	Depressive symptoms							
	Normal		Possible		Definite		Total	
	N	%	N	%	N	%	N	
Normal	291	54.3	183	34.1	62	11.6	536	
Acute undernutrition	8	66.7	4	33.3	0	0	12	
Chronic undernutrition	28	31.1	32	35.6	30	33.3*	90	
Growth failure	3	20	9	60.0	3	20.0*	15	
Total	330		228		95		653	

* F= 10.82, P< 0.001

Table 2
The Relationship Between the Nutritional Status and Behavioral Problems of Primary School Children Aged 9-11 years.

Behavior Problem Nutritional Status	Normal		Possible		Definite		Total
	N	%	N	%	N	%	N
Normal	281	52.4	150	28.0	105	19.6	536
Acute Undernutrition	5	41.7	3	25.0	4	33.3*	12
Chronic Undernutrition	28	31.1	33	36.7	29	32.2*	90
Growth Failure	3	20.0	5	33.3	7	46.7*	15
Total	317		191		145		653

* $F = 11.09, P < 0.001$

Table 3
The Relationship Between the Nutritional Status and Intelligence in Primary School Children

Nutritional Status I.Q. Score	Normal		Acute Undernutrition		Chronic Undernutrition		Growth Failure	
	N	%	N	%	N	%	N	%
0-70	13	2.4	0	0	2	2.2	1	6.7
71-80	13	2.4	0	0	0	0	2	13.3
81-90	41	7.6	4	33.3	35	38.9	7	46.7
91-110	135	25.2	6	50.0	24	32.2	2	13.3
111-120	161	30.0	1	8.3	18	20.0	3	20.0
121-140	166	30.9	0	0	5	5.6	0	0
>141	7	1.3	1	8.3	1	1.1	0	0
Total	536		12		90		15	

 $\chi^2 = 67.8$ $P < 0.000$

CR = 5.85

CI = 3.62-8.4

ly significant difference according to sex or age. 90 (76.9%) children were affected by chronic undernutrition (51 boys and 39 girls). There was no statistically significant difference according to sex or age. 15 children (12.8%) (6 boys and 9 girls) (20%) had growth failure.

Table (1) shows that of those children with acute, chronic undernutrition and growth failure (53.3%) exhibited significantly more depressive symptoms than children with normal nutritional status (11.6%) ($F = 10.82, P < 0.001$).

Table (2) shows that, children with acute, chronic undernutrition and growth failure exhibited significantly more behavioral problems than those with normal nutritional status ($F = 11.09, P < 0.001$).

Table (3) shows the relationship between the nutritional status and the distribution of I.Q. scores. 87.5% of children with normal nutritional status have their I.Q. scores above 90. On the other hand, only 66.7% of those with acute undernutrition, 53.3% of those with chronic undernutrition, and 33.3% of

In this group there was no statistical-

those with growth failure have their I.Q. scores above 90. While only 12.4% of children with normal nutritional status have their I.Q. below 80, between 33.3% and 46.7% of undernourished children have their I.Q. scores below 80.

Discussion

Any type of nutritional deficiency (caloric, protein, vitamins or minerals deficiency) may retard the growth rate. Undernutrition does not only affect cognitive and behavior development, but also it was proved that individuals subjected to chronic undernutrition during childhood were shorter than their age and sex matched adult peers (Goldstein, 1987, Green et al. 1984).

Our data suggest a relationship between the presence of evidence of undernutrition and psychological, behavioral and intellectual abnormalities. These findings of increased incidence of depression, behavioral problems and lowered I.Q. range observed in the index children could not be related directly to poor socioeconomic conditions at the time of the study, although there were such assumptions in our mind during assessment. This study was carried out in a representative public primary schools which at least guarantee some sort of homogeneous socioeconomic conditions. Although we did not measure the daily food intake of those children and we did not take into account the growth hormone blood levels, however, we can speculate that the very slow rate of linear growth can be understood as a neuroendocrine concomitant of a severe undernutrition in a person who is still growing. Patton and Gardner (1975) have suggested in a similar way that even states of depression of apathy may affect functions of the cortex and anterior hypothalamus or median eminence and via hypophyseal pathways influence growth hormone (GH) release. Similar hormonal abnormalities have been found in depressed prepubertal children, namely decreased GH release following stimulation and cortisol secretion (Puig-Antich et al, 1979, 1981). Since

some psychosomatic disorders (PSDs) also exhibit depressive symptoms, this could be a contributory factor in some cases (Krieger and Good 1970, Martin 1976, Brasel, 1980, Meites and Fiel, 1965).

The role of undernutrition in the causation of disruptive behavior is less clear because many children in this study with undernutrition did not show evidence of emotional, behavioral or intellectual dysfunctioning. Behavioral development obviously is dependent upon the growth and functional maturation of the central nervous system. Thus, undernutrition could be interfering with critical biological functioning resulting in problematic behavior. One implication for our findings is that axis III of DSM-III - R which is allocated for physical disorder or findings should emphasize that for children and adolescence. The height and weight percentile points must be registered on that axis particularly for those below the 10th percentile as it could be a risk factor for behavioral, cognitive, and emotional problems. It has been our observation that not all malnourished children develop psychiatric problems.

Karlsson et al (1989) in an epidemiological study of growth curves of school-age children found that children with abnormal growth exhibited deviant growth, usually several years before showing any psychiatric symptoms. In other words, abnormalities of physical growth in children often antedate the development of clinical psychiatric disorders in the school period by several years. This means that an abnormal growth pattern in childhood in some cases might be the first indication of something being the matter with the child's psychological development. Psychiatric problems might come to attention at an earlier stage if this relationship is acknowledged. Studies of growth-and diet-may therefore turn out to be important for the understanding and treatment of psychiatric disorders in children.

This study suggests a strong association between malnutrition and behavioral, psychological, and intellectual problems. Malnutrition was found to be associated with increased risk of depression (almost 2.4X greater), behavioral problems (almost 2.5X greater), and IQ equal or lower than 90 (over 5.8X greater).

Our findings of an association between undernutrition and behavioral, psychological, and intellectual problems suggest that future psychiatric research and research in the field of developmental medicine should focus on protective factors that hinder the development of such adversities in undernourished children. Also effort to improve the psychiatric services for children in developing countries should collaborate with nutritional rehabilitation and health education about the effect of sound nutrition on the emotional, behavioral and cognitive developmental of children.

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Manifestations Psychiatriques de la Malnutrition chez des Enfants de 9 à 11 ans à Port-Said

La malnutrition avec ses conséquences psychologiques, intellectuelles et comportementales représente un problème de santé majeur dans les pays en voie de développement. Dans cette étude nous avons évalué la prévalence de la malnutrition dans un échantillon d'enfant d'âge scolaire (n=653) à Port-Said.

Le statut psychologique a été évalué avec l'échelle de la dépression de Johns Hopkins, le fonctionnement intellectuel avec le test des aptitudes mentales et les troubles de conduite avec l'échelle, parent-instituteur, d'hyperactivité de Conners.

Nos résultats ont montré que les enfants souffrant de sousnutrition chronique étaient plus vulnérables aux troubles du comportement, à la dépression et avaient un Q.I plus bas que les enfants sans problèmes nutritionnels. Ces résultats soulignent l'importance de l'intervention psychiatrique au cours de la prise en charge du problème de la malnutrition chez ces enfants.

المصاحبات الطبفسية لسوء التغذية

في الأطفال في سن ٩ - ١١ سنة في مدينة بور سعيد

تعتبر مشاكل سوء التغذية من الأولويات الصحية الهامة في مجال الطفولة في الدول النامية. وقد قامت هذه الدراسة بإجراء مسح عنه عشوائية منظمة (عدد ٦٥٣) من تلاميذ المدارس الابتدائية في مدينة بور سعيد (يتراوح عمرهم من ٩ - ١١ سنة) وذلك لتصنيف وتشخيص اضطراب سوء التغذية وباستخدام النسبة المئوية العاشر كحد فاصل لقله ونقص الوزن والطول وسوء التغذية. وقد طبق مقياس جونز هوبكنز للإكتئاب ومقياس كورنر لسلوك الطفل (نسخه المدرس والوالدين) بالإضافة لإختبارات القدرات العقلية لقياس حاصل الذكاء.

وأظهرت النتائج أن نسبة انتشار سوء التغذية في تلاميذ المدارس الابتدائية في الفئة العمرية ٩ - ١١ سنة هي ١٧.٩٪ (سوء تغذية حاد ومزمن وفشل نمو)، وعانت نسبة كبيرة ذات دلالة إحصائية من الأطفال المصابين بسوء التغذية من الأعراض الاكتئابية والمشاكل السلوكية أكثر من أقرانهم الأسوياء ذوي الحالة الصحية الغذائية الطبيعية. كما حصل الأطفال المصابون بسوء التغذية على معدل أقل في حاصل الذكاء من الأطفال الأسوياء. وناقشت الدراسة الآليات الثانوية والعوامل التي تؤدي إلى ظهور المضاعفات الطبفسية في حالات سوء التغذية. كما أوصت الدراسة بأن هؤلاء الأطفال المصابين بسوء التغذية يجب أن ينالوا التدخل العلاجي والرعاية الطبفسية بالإضافة إلى التعويض الغذائي اللازم.

Sexual Dysfunction in Patients with Major Depression

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Fifty male patients diagnosed as major depression according to DSM-III-R were selected randomly from psychiatric outpatient clinic. They were initially assessed by psychometric tools as regards personality, anxiety and depression. Also their psychosexual functioning were asked about. Serum level of testosterone and prolactin were measured.

Patients received treatment with tricyclic antidepressants for six months after which they were reassessed.

Patients were divided into two groups according to their sexual functioning. Results showed that there were no statistically significant differences between both groups as regard level of depression and hormones. However the group with sexual dysfunction was significantly older in age, had a higher level of anxiety, more introvert and with higher level of criminality and neuroticism.

After treatment most of patients showed improvement but some patients did not improve. Even some developed decrease in their sexual performance.

There was a significant increase in the level of prolactin and significant decrease in the level of testosterone after treatment in whole patients. But there was no significant difference between those who improved and those who did not.

Also there is no significant difference between the patients who developed side effect of the antidepressants and who did not develop such side effect which was decreased in sexual performance. The implications of these findings were discussed.

(Egypt. J. Psychiat., 1992, 15: 184-191).

Introduction

Impotence is a common disorder, that can have a profound effect on patients' well being. Increasingly, the psychiatrist has been asked to work in the evaluation and treatment of people with impotence (Krane et al. 1989).

Libido and potency may be reduced or abolished in endogenous depression.

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However sexual interests and desires are probably affected as a general consequence of the depressed state, rather than because of any physiological mechanism (Small and Small 1975).

Attempts at establishing a relationship between prolactin and depression have yielded conflicting results (Fava, et al. 1988). In different comparisons of the basal prolactin levels of depressed patients levels have been found to be higher, lower, and the same (Lisansky, et al. 1984).