

**THE RELATIONSHIP BETWEEN NUTRITION OF
CHILD AND DEVELOPMENT OF BODY,
PSYCHOLOGICAL AND MENTAL
STUDYING ON THE CHILDHOOD FROM 4-6 YEARS**

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List of Abbreviations

AA	<i>ARACHIDONIC ACID</i>
ACC/SCN	<i>Administrative Committee on Coordination/Sub-Committee on Nutrition</i>
ADHD	<i>Attention-deficit/hyperactivity disorder</i>
AIDS	<i>Acquired immunodeficiency syndrome</i>
ANOVA	<i>Analysis of variance</i>
BMI	<i>Body mass index</i>
BPP	<i>Borge Priens Prove</i>
CA	<i>Chronological age</i>
CDC	<i>Centers for Disease Control</i>
CI	<i>Confidence interval</i>
CNS	<i>Central nervous system</i>
CS	<i>Cesarean section</i>
DHA	<i>Docosahexaenoic acid</i>
GL	<i>Glycemic load</i>
GOTHI	<i>General Organization of Teaching Hospitals and Institutes</i>
HDL	<i>High density lipoprotein</i>
HIV	<i>Human immunodeficiency virus</i>
IQ	<i>Intelligence quotient</i>
IUGR	<i>Intrauterine growth retardation</i>
LBW	<i>Low birth weight</i>
LCPUFA	<i>Long-chain poly-unsaturated fatty acids</i>
LDL	<i>Low density lipoprotein</i>

MA	<i>Mental age</i>
MDG	<i>Millennium Development Goal</i>
MRI	<i>Magnetic resonance imaging</i>
NCHS	<i>National Center for Health Statistics</i>
NNI	<i>The National Nutrition Institute</i>
RSP	<i>Research Support Program</i>
SD	<i>Standard deviation</i>
SPSS	<i>Statistical package for social sciences</i>
UK	<i>United Kingdom</i>
USA	<i>United States of America</i>
VEP	<i>visual evoked potentials</i>
WAIS	<i>Wechsler Adult Intelligence Scale</i>
WHO	<i>World Health Organization</i>

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ABSTRACT

Nutrition has a considerable influence on human's health, not only in physical terms, but also mental and cognitive. Inadequate dietary intake may have a detrimental impact on a child's health. Excess dietary intake is unfavorable, especially excess intake of energy, which results in overweight and obesity, as well as undernutrition, which may cause stunting and adversely affects the development of all organs and systems of the child's body. The aim of the present study is to assess role of nutrition, played in physical, mental and psychological children development at early childhood stage. This is a cross sectional clinical study that had been held at National Nutritional Institute. The present study included cases attended the National Nutrition Institute, at one year period. The eligible cases for participation in the study should be (4 – 6 years). 120 cases were included in this study. Subjects of the study completed detailed questionnaire especially for; Mental abilities of the children were assessed by a special tests as drawing objects, remembering words and numbering; and psychological parameters were assessed using the revised behavior problems checklist The present study included 120 children, 76 of them (63.3%) had appropriate nutrition while 44 (36.7%) had inappropriate nutrition. There was statistically significant increase in weight, height and BMI (22.84 ± 8.55 , 115.15 ± 8.79 and 16.90 ± 5.01 respectively) in cases with appropriate nutrition when compared to those with inappropriate nutrition (15.82 ± 2.04 , 107.09 ± 7.01 and 13.78 ± 1.07 respectively). As regard degrees in mental ability tests, there was statistically significant increase in mental age in children with appropriate nutrition when compared to children with inappropriate nutrition (5.15 ± 1.02 and 4.01 ± 0.80 respectively). There was statistically significant increase in cognition achievement in children with appropriate nutrition when compared to those with inappropriate nutrition. In addition, there was statistically significant increase in positive cases with behavioral problems in children with inappropriate nutrition when compared to those with appropriate nutrition, i.e. behavioral problems were more prevalent in low nutritional status. Conclusion: the results of the present study proved that good nutrition is associated with better performance in cognition abilities and behavioral actions. In addition to good physical built. Thus, it is mandatory to accomplish balanced and full nutritious diets for our children, especially in their early years of life.

INTRODUCTION

Infant growth depends completely on his nutrition for his growth especially in first 5 years of his life, as these years represent the period of body formation. So, healthy food should be supplied to avoid nutritional deficiency in the first 5 years of life. The nutritional deficiency cannot be compensated later after child growth, as this period is the period of various tissue formations especially bones which is affected by nutritional deficiency.

Balanced food:

Balanced food means the food contains all necessary nutritional elements with sufficient amount needed for daily requirements. There is no food in nature that contains all the necessary elements. So, nutritional balance depends on collaboration of group of foods with each other to complete the deficiency of each other. Food has been classified into 5 principle groups, cereal and substitutes, vegetables, fruits, meat and milk & its substitutes and energy supplements.

Each group resembles each other for containing nutritional elements and eating of the five groups daily will make diversion list of foods that could measure up with people taste and supply the dietary recommendations. Healthy food is one of the important preventive measures against diet related

disease wetter. Under nutrition or over nutrition as anemia, protein energy malnutrition, diabetes, malignancy and atherosclerosis... etc. Good nutrition for mother before and during pregnancy decrease the prevalence of abortion, premature labor and many other pregnancy problems and disease beside newborn infant diseases.

AIM OF THE STUDY

To assess role of nutrition, played in physical, mental and psychological children development at early childhood stage.

NUTRITIONAL REQUIREMENTS OF PRESCHOOL CHILDREN

The importance of nutrition in preschool age

Nutrition has a considerable influence on human's health, not only in physical terms, but also mental and cognitive. Inadequate dietary intake may have a detrimental impact on a child's health. Excess dietary intake is unfavorable, especially excess intake of energy, which results in overweight and obesity, as well as undernutrition, which may cause stunting and adversely affects the development of all organs and systems of the child's body. This especially concerns the central nervous system, but also the other systems, for example the immune system, whose reaction is a decrease in immunity (**Merkiel and Chalcarz, 2007**).

Nowadays, undernutrition is prevalent in preschool children who live in the poorest, developing countries and come from the lowest social classes, for instance in Ethiopia, India, Mexico, the Republic of Maldives and South Africa. Energy intake in those children is very low, from merely 50% of the norm to only 80% of the norm, and is accompanied by deficiencies of many nutrients, sometimes extreme, like in preschool children from a rural community in South Africa, whose intake of energy from animal protein was 0% (**Kapil U, Bhavna, 1999; Golder et al., 2001; Barquera et al., 2003**).

In highly developed countries energy undernutrition is rare and is usually the result of chronic diseases or psychosocial disorders (**Zemel et al., 1997**).

In these countries a growing problem is excess energy intake (**WHO, 1995**).

However, it does not exclude the problem of nutrient deficiencies. The reason is that in highly developed countries preschool children's diets are of low quality. Along with high energy intake they provide too few nutrients, for example, calcium and vitamin D, adequate intake of which is necessary for the proper development of the skeleton (**Zhu et al., 2001**).

Particularly adverse is deficient intake of nutrients which have a significant influence on brain development. Among these nutrients are first and foremost iron, zinc, iodine, folic acid, vitamin B12 and polyunsaturated fatty acids (**Bryan et al., 2004**).

Arija et al. (2006) showed significant and positive relationships between iron intake and intelligence quotient and between folic acid intake and intelligence quotient in six-year-old children from Spain. Eicosapentaenoic acid is of great relevance – insufficient intake may be related to attention-deficit/hyperactivity disorder (ADHD) in children, dyslexia, dyspraxia and autistic spectrum disorders.

When considering the importance of nutrition during childhood, one should not forget about its influence on health

later in life. The consequences of the childhood diet may be observed even in adult life. Qualitative and quantitative imbalance in the childhood diet predisposes to hypertension, coronary heart disease, obesity, osteoporosis and diabetes later in life. Preventing diet-related diseases in adulthood is delayed because raised biochemical indices of these diseases are often observed as early as in childhood and adolescence (**Law, 2000**).

Adequate nutrition during childhood also has a psychological aspect. Dietary behavior during childhood has an influence on attitudes toward nutrition, which is evident for the whole life. Dietary habits formed during childhood are to a small extent apt to change later in life. Unwillingness to give up eating well-known and preferred foods is one of the most frequent obstacles in the way of a healthy diet. All the actions, including educational ones, aimed at promoting healthy dietary behavior turn out to be effective only if focused on those foods which are liked and frequently consumed (**Merkel and Chalcarz, 2007**).

Birth to 2 Years

It is important for parents or parents-to-be to obtain a healthy weight because children whose mothers are obese early in pregnancy are more likely to be overweight as young children. A similar effect is seen in children whose parents are or become obese during their childhood. To ensure optimal growth of the fetus, pregnant women must optimize their nutrition and weight gain during pregnancy, according to the Institute of Medicine guidelines (**Whitaker, 2004**).

Human milk is uniquely superior for infant feeding and is the reference against which other infant feeding strategies must be measured (**Gartner et al., 2005**).

Breast milk is rich in both saturated fat and cholesterol but low in sodium. Systematic reviews, however, suggest benefits of breast-feeding, particularly in the prevention of future obesity (**Owen et al., 2005**).

The first potential benefit may be better self-regulation of intake. Compared with parents who bottle-feed, mothers who breast-feed appear to allow the infant to take an active role in controlling intake, possibly promoting maternal feeding practices that can foster better self-regulation of energy intake as the child grows up (**Fisher et al., 2000**).

Children with improved self-regulation may better withstand the current food surplus environment.

The second potential benefit relates to taste preference. Both amniotic fluid and breast milk provide flavor exposure to the fetus and infant. These exposures influence taste preference and food choices after weaning. Thus, exposure to healthier foods through maternal food consumption during pregnancy and lactation may improve acceptance of healthy foods after weaning. Because infant responses to taste are different than mature taste, these early exposures may be critical in determining food preference later in life (**Mennella et al., 2004**).