ADEQUATE NUTRITION AS A DETERMINANT OF WEIGHT AND HEIGHT OF THE PRE-SCHOOL SCHOLARS IN UYO METROPOLIS.

BY

ROSEMARY COLLINS PIATE
DEPARTMENT OF HOME ECONOMICS,
AKWA IBOM STATE COLLEGE OF EDUCATION,
AFAHA NSIT.

ABSTRACT

The study investigated adequate nutrition as a determinant of weight and height of the pre-school scholars in Uyo Metropolis. The population of this study comprised all pupils in pre-schools (3-5 years) in Uyo metropolis which was about twenty five thousand (25,000). The study adopted Simple random sampling technique which was used to select 10 out of the total number of nursery schools in Uyo Metropolis. The instrument for data collection which was Anthropometrics indexes which provide an appropriate reflection of nutritional status of the pre-school children including weight and height" was administered to the respondents and used for the study. Experts in test and measurement were contacted for thorough check and experts inputs before test-retest was used for the reliability of the instrument. Data collected were analyzed using appropriate statistical techniques such as percentage analysis, chart and simple regression analysis. From the results of the data analysis, it was observed that adequate nutrition has remarkable effect on the weight and height of pre-children in Uyo metropolis. The conclusion was that weight and height are obtained from the quality and quantity of nutritional intake and adequate nutrition determines the level of growth of the pre-school children. One of the recommendations was that adequate nutrition is necessary for the weight and height of the pre-school children and so parent should not allow essential vitamins to lack in their daily meals.

KEY WORDS: Adequate Nutrition, Weight and Height, Pre-School Scholars, Uyo Metropolis

INTRODUCTION

Adequate nutrition is understood to be the intake of food that contains complete diet nutrients and at the appropriate time. Nutrition is the study of all the elements contained in food to satisfy certain needs or requirements, in order to ensure proper growth, repairs and maintenance of the human body (Thompson, 2006). Merck and Merck (2007) opined that to receive adequate nutrition, people need to consume a healthy diet, which consists of a variety of nutrients. Thus, a healthy diet enables people to maintain a desirable body statue and composition and to perform their daily physical and mental activities. Generally, nutrients are divided into two classes; macronutrients and micronutrients. Macro-nutrients are required daily in large quantities for adequate nutrition. They include proteins fats, carbohydrates, minerals and water. Water is required in amount of 1 millimeter for each calories of energy expended a day.

Micronutrients are required daily in small amount daily in small amount in milligrams. They include vitamins and trace minerals that enable the body to use the macro-nutrient. Merck and Merck (2007) assert that adequate nutrient needed by the body in its proper usage must

contain both the macro-and the micronutrient as well as water. Shannonn (2001) observed that of every ten children born in developing countries, one child will die before his/her fifty birthdays. This extremely high death toll demonstrates the vulnerability of infants and young children due to inadequate nutrition and poor health. The fact is a large majority of child deaths in developing countries are preventable with a combination of good health care, adequate nutrition and appropriate medical treatment. This brings hope that, the unacceptably high mortality can be reduced with effective interventions. The importance of adequate nutrition during early life cannot be underestimated, it is for energy and growth of individual, (WHO, 2005).

Malnutrition is defined by the world health organization (WHO, 2000) as the cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions. Indicators of malnutrition's include stunted growth and being underweight. A common form of malnutrition observed most frequently in developing countries, including Nigeria, is the protein energy malnutrition (PEM). Kwashiorkor and Marasmus are two forms of PEM that are very common. In addition to (PEM), children may be affected by micronutrient deficiencies which also have detrimental effects on growth and development. The most common and clinically significant micronutrient deficiencies in children throughout the world include deficiencies of iron, iodine, folate, vitamin D and vitamin A (Hendrickse, 1997).

As observed by Asanga (2004), better food results in a healthier body and mind, in more energy, in more positive outlook and in better brain development. From nutritional stand point, informal, or the first seven years of life, are the most important years in the life of a child. Malnutrition during this period hampers the academic performance of the child. The level of malnourishment among primary and pre-school children in Uyo metropolis is summarized in the following data obtained from the Nigeria food consumption and Nutrition survey 2001-2003.

Table 1.1
Nutritional status of children 0-5 years
In Akwa Ibom State (%Prevalence)

	No. of Observations	Mild (<-1SD	Moderate (<-2SD)	Severe (<-3SD)	Total(%)
Stunting	565	17.7	17.3	12.6	47.6
Wasting	545	22.8	4.8	1.5	28.1
Underweight	560	27.5	14.5	2.1	44.1

Source: IITA (2004). Nigeria Food Consumption and Nutrition Survey 2001-2003

Table 1.2

Micro-nutrient status of children 0-5 years
In Akwa Ibom State (% prevalence)

	No. of Observations	Normal (%)	Deficient (%)	Above Normal (%)
Vitamin A	436	70.9	29.1	-
Vitamin E	436	79.6	20.4	-
Iron	438	47.5	24.8	27.7
Zinc	174	93.1	6.9	-
Iodine	196	29.1	29.1	41.8

Source: IITA (2004). Nigeria Food Consumption and Nutrition Survey 2001-2003

Statement of Problem:

Although it has been established that deficiencies in nutrition have deleterious effects on all kinds of development, for both pre and primary school children, educational development takes pre-eminence over other types of development. A child must be properly educated in order to live a worthwhile life in the society. A malnourished child, research confirms, cannot perform well academically. He lacks the courage and strength to even associate with his mates. Therefore, the need for a study of adequate nutrition or malnutrition on academic performance of a pre-school child becomes very apparent as every parent/teacher wants to see the child do well academically so as to be able to cope up with the task ahead of him both in school and at home. In recent years, a number of study have been carried out on the relationship between nutritional deficiencies and academic performance of children, such have been based mainly on children from poor families in Latin America, India, South Africa and Colorado. Similar studies are necessary in this part of the world, and it is worth mentioning here that malnutrition or adequate nutrition is a fundamental problem among Nigerian Children.

Purpose of the Study:

The objectives of the study are as follows:
1. To assess the effects of adequate nutrition on weight gain of the pre-school children in Uyo metropolis.
2. To examine the effects of adequate nutrition on height of the pre-school children in Uyo metropolis.

Research Questions:

The following research questions will guide the study:
1. What is the effect of adequate nutrition on weight gain of the pre-school children in Uyo metropolis?
2. What is the effect of adequate nutrition on height of the pre-school children in Uyo metropolis?

Research Hypotheses

The following research hypotheses will be tested at 0.05 were drawn from the level of significance
1. There is no significant effect of adequate nutrition on weight gain of the pre-school children in Uyo metropolis.
2. There is no significant effect of adequate nutrition on height of the pre-school children in Uyo metropolis.

LITERATURE REVIEW

Growth in Infant

The word "infant" is derived from the Latin word "infants" meaning "unable to speak". Thus, many define infancy as the period from birth to approximately 2 years of age, when language begins to flourish. It is an exciting stage in life. The infant is a dynamic, ever changing being who undergoes an orderly and predictable sequence of neurodevelopment and physical growth. This sequence is influenced continuously by intrinsic and extrinsic forces that produce individual variation and make each infant's growth path unique (Johnson & Blasco, 2007). Intrinsic influences include the child's physical characteristics, state of wellness or illness, temperament, and other genetically determined attributes. Extrinsic influences emanates primarily from the family: the personalities and style of care giving by parents and siblings, the family's economics state with impact on resources of time and money, and cultural Milieu into which the child is born (Johnson & Blasco, 2007).

Infant's growth can be viewed broadly in terms of the traditional developmental milestones. This traditional developmental milestone provides a systematic approach by which to observe the progress of the infant over –time. For instance a two (2) year old infant would not be able to speak well. Five word sentence to the child, whom at this stage does not follow simple command may represent echolalia typical of antism. (echolalia is the involuntary repetition of words in a disordered form).

Although, according to Johnson & Blasco (2007), infants' development occurs in an orderly and predictable manner. It proceeds from cephalic to caudal and proximal to distal as well as from generalized reactions to stimuli to specific goal-directed reactions that becomes increasingly precise. The quality of infant's relationship with key individuals was considered central to future development. During the second half of the century the name of piglet became almost synonymous with child development. Piaget (2002) was the first to describe the infant as having intelligence (Johnson & Blasco, 2007). For centuries, it has been assumed that the infant's mind was a 'blank tablet waiting to be written on". Because infants could not tell us what they were experiencing, it was believed that they saw and heard little and thought even less, with consciousness as adults. Therefore, Piaget revealed that infant were able, and capable of thinking, analyzing and assimilating.

Physical Growth

Growth milestones are the most predictable, although they must be viewed within the context of each child's specific genetics and ethnic influences. It is essential to plot the child's growth on gender and age. Accordingly, fetal weight gain is greatest during the third trimester. During the first two (2) months of life, this rapid growth continues, after which the growth rate decelerate. Birth weight is regained by 2 weeks of age and doubles by 5 month. Height does not double until between 3 and 4 years of age. Similarly, head growth during the first 5-6 months is due to continued neuronal cell division. Later increasing head size is due to neuronal cell growth and supporting tissue proliferation (Barker et. al., 1993). According to Johnson & Blasco (2007), large and small head size, both are relative red flag for developmental problems. Failure to develop protective reactive may indicate neurometor disorder.

Adequate Nutrition and Weight of Pre-School children

Good nutrition and weight maintenance are extremely important for pre-scholars. The vitamins nutrients and energy that nutrition food provides can help stave off illness among Pre-School children. Bongain et al (1998) opine that maintaining weight and preventing loss of muscle mass (called lean body mass), bolsters general health and the body's ability to fight disease. Rivera (2007) opines that a good nutrition needs to follow 3 rules for proper weight:

- It should favour smaller and frequent feedings throughout the day instead of smaller ones.
- Every meal should have carbohydrate, protein and fat in their correct ratio; 40/40/20 respectively.
- The calorie should be cycled to prevent the metabolism from getting used to a certain calorie level.

Inadequate nutrition and weight lose are common problems which are linked to various sickness like HIV. Inadequate nutrition may result from loss of appetite due to depression, illness or drug side effect. Norgan (1994) says proper weight maintenance can be a sign of adequate nutrition while weight loss can be an obvious sign of inadequate nutrition.

Norgan (1994) adds that there are many ways to prevent weight loss. Using different approaches may be needed. A healthy person with no sign of weight loss will probably develop a very different kind of strategy than someone with significant weight loss. Weight loss due to problem in the gut, diarrhea, or other conditions may need different interventions than weight loss due only to drug side effect. Bongain, Ohsum, Kanaya and Osumi (1998) opine that adequate nutrition and maintenance of weight are correlates. They outlined the following few points to be considered in the maintenance of weight of Pre-School children:

- Rigorously diagnose and properly treat causes of weight loss and promptly.
- Follow reasonable guidelines for safer food preparation.
- When necessary, consider the use of supplement to replenish deficiencies.
- Learn and adhere to the pros and cons of various interventions
- Proper exercise should also be considered.

Bogin (2001) says the importance of adequate nutrition and maintaining normal body weight cannot be overemphasized. Good nutrition, combined with exercise, strengthens the body and mind. He adds that whenever possible, it is far better to correct nutritional imbalance problem before they become sever. This may mean intervening with the improved diet appetite stimulants or weight gain supplements. The strategy for coping nutrition and weight balance should be checked periodically, adapting it to one's body changing needs.

Two people (for instance two Pre-School children), at the same weight level may approach exercise and nutrition differently, some may be willing to follow a workout regimen and careful diet may rebound from weight loss by simply adopting better eating habits. Other(s) who may be less inclined to exercise and finds it more difficult to carefully follow a diet may need more invasive interventions, ranging from the use of appetite stimulants and supplements to total parental nutrition (TPN) (Piatti and Caumo, 1994).

Adequate Nutrition and Height of Pre-School children

According to Eveleth and Tanner (1990), the most important nutrient for final height is protein in pre-school children. Minerals in particular calcium and vitamin A and D also influence height. Thus, inadequate nutrition in Pre-School children is detrimental to height. In general, boys will reach maximum height in their late teens, whereas girls reach their maximum height around their mid-teens. Therefore, adequate nutrition before puberty is crucial for height. In addition, although diseases of childhood can inhibit ultimate stature, human growth hormone

treatment can remedy such growth defects. Height accelerated by such treatment or special supplements, however, cannot be predicted based on heritability. There are two reasons; first, heritability has not been estimated in a growth hormones-treated population. Second, genes and growth hormones can interact synergistically to affect height, i.e. their effects may not be simply adding to each other but could be multiplying the ultimate effect. Human height is quantitative, i.e possess characteristics that is measured in quantity and controlled by environmental effects, such as nutrition. Eveleth and Tanner (1990) assert that about 50% to 60% of the difference in height between individuals is determined by environmental factor mainly nutrition.

Many studies have estimated the nutritional effect of human height, the studies found out that different environment offers different nutrition which accounts for the difference in height of pre-scholars (Barker et al, 1991). For instance, Miao-xin Li (2004) of Human Normal University in China and his Colleagues estimated height heritability of 50% due to genetic factor while the remaining 50% was due to nutritional effect. Similarly, a study carried out by Robert (1978) at Newcastle University in England about African (West) posits that 55% of the human height was due to dietary habit.

Murray (1997) asserts that average height is increasingly used as measure of the health and wellness (standard of living and quality of life) of populations. Attributed as a significant reason for the trend of increasing height in parts of Europe is the egalitarian population where proper and adequate nutrition are relatively equally distributed. Murray (1997) however, noted that changes in diet (nutrition) and a general rise in the quality of health care and standard of living are the cited factors in the Asian populations.

Eveleth and Tanner (1990) opine that severe malnutrition (inadequate nutrition) is known to cause stunted growth in North Korea, portions of Africa, certain historical European, and other populations. They further advanced that Diet (in addition to needed nutrients; such as junk food, exercise, fitness, pollution exposure, sleep pattern, climate are other factors that can effect final height). McCarron Craig, Braley and Muir (2002) assert that height is determined by the complex interactive combination of genetics and environment. Genetic potential plus nutrition, minus stressors is a basic formula. Genetically, the heights of mother and son and of father and daughter correlates suggesting that shorter mother will more likely bear a shorter son, and tall fathers will have tall daughters

METHOD
Research Design
A quasi-experimental research design will be used for the study. This design is necessary as it is experimented in nature with a capacity for comparison and correction of the variables.

Area of the Study
This area of the study is in the Uyo metropolis of Akwa Ibom State.

Population of the Study
The population of this study comprises all pupils in pre-schools (3-5 years) in Uyo metropolis. The total population for this study is about twenty five thousand (25,000).

Sample and Sampling Technique

Simple random sampling technique will be used to select 10 out of the total number of nursery schools in Uyo metropolis. This will give a sample size of 150 infants' respondents who will be used for the study

Instrumentation

The main instrument that was used in the study was Anthropometrics indexes which provide an appropriate reflection of nutritional status of the pre-school children. These include accurate measurement of weight and height. National Center for health statistics (NCHS) data was used as a standard. An interview method, with the use of questionnaire tagged, a researcher made instruments on nutrition and infant growth questionnaire (NIGQ) was used.

Validation of Instrument

Experts in test and measurement were contacted for thorough check and experts inputs. Finally, the thesis supervisor ensured that there was effective constructive criticism on the formulation of the questionnaire to measure the stipulated variables.

Reliability of the Instrument

For the reliability of the instrument, teat-retest was be used.

Data Analysis technique

The collected data were analyzed with the use of appropriate statistical techniques such as percentage analysis, chart and simple regression analysis.

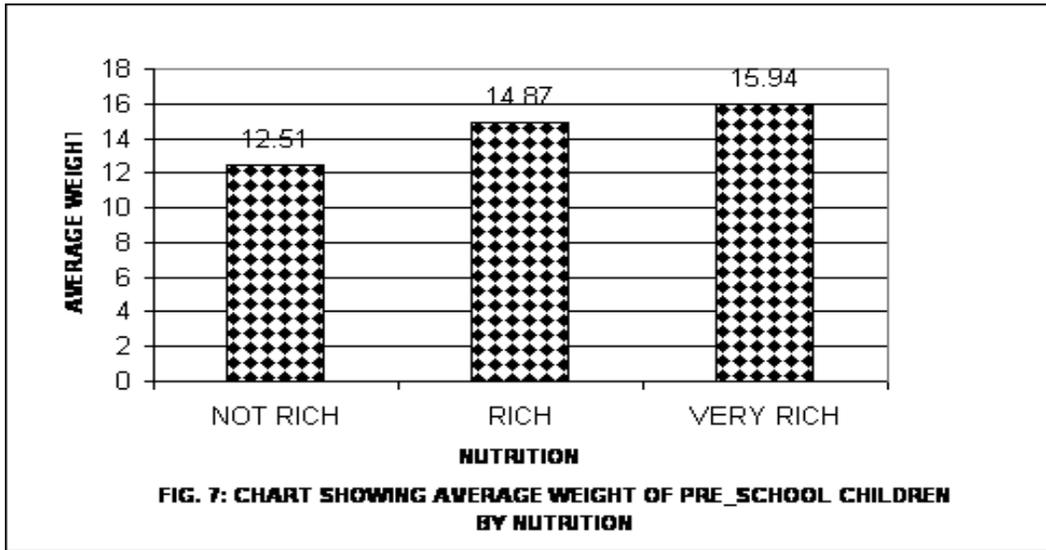**Data Analyses and Result**

Research Question One

The research question sought to find out the extent to which adequate nutrition affects the weight of the pre-school children in Uyo metropolis. The answer to the research question is in table 1

Table 1: Effects of adequate nutrition on the weight of the pre-school children in Uyo metropolis

Nutrition	Weight		
	N	X	SD
Very rich	32	15.94**	2.55
Rich	45	14.87	2.67
Not rich	73	12.51*	1.82
Total	**150**	**13.95**	**2.68**

*The highest mean score

*The least mean score

FIG. 7: CHART SHOWING AVERAGE WEIGHT OF PRE_SCHOOL CHILDREN BY NUTRITION

The above table 1shows the level the effect adequate nutrition has exerted on the weight of the pre-school children in Uyo metropolis. From the results it was observed that pre-scholars that are fed with very rich nutrition had the heaviest weight (15.94). This was seconded by those of rich nutrition (14.87) while the pre-children with the least level of weight were those led with fairly rich nutrition (12.51). This result therefore means that adequate nutrition has remarkable effect on the weight of pre-children in Uyo metropolis.
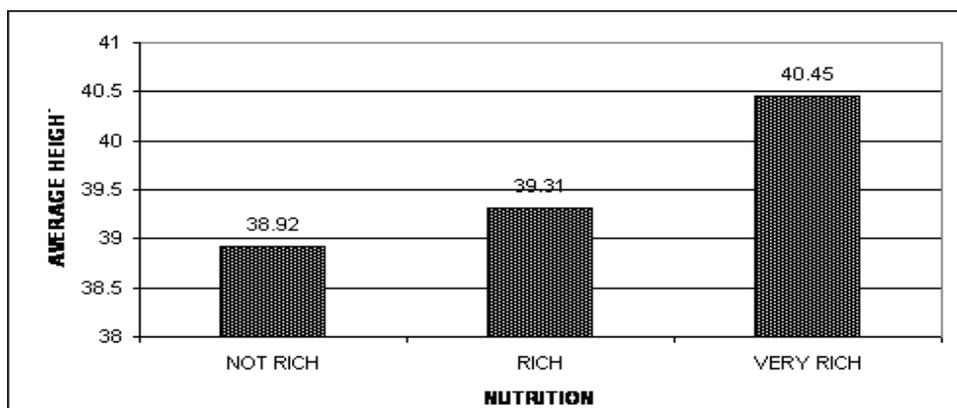
Research Question Two

The research question sought to find out the extent to which adequate nutrition affects the height of the pre-Children in Uyo metropolis. The answer to the research question is in table 2.

Table 2: Effects of adequate nutrition on the height of the pre-school Children in Uyo metropolis

Nutrition	Height		
	N	X	SD
Very rich	32	40.45**	2.63
Rich	45	39.31	2.27
Not rich	73	38.92*	1.91
Total	**150**	**39.36**	**2.25**

**The highest mean score
*The least mean score

The above table 2 shows the level the effect adequate nutrition has exerted on the height of the pre-scholars in Uyo metropolis. From the table, it was observed that pre-scholars that are fed with very rich nutrition had the greatest height (40.45). This was seconded by those of rich nutrition (39.31) while the pre-school children with the least level of height were those fed with fairly rich nutrition (38.92). This result therefore means that adequate nutrition has remarkable effect on the height of pre-school children in Uyo metropolis.

Hypothesis one

The null hypothesis states that there is no significant effect of adequate nutrition on weight of the pre- school children in Uyo metropolis. In order to test the hypothesis, independent and dependent variables were identified. The variables were subjected to simple regression analysis in order to generate the predicted (ŷ) value of y weight for X^1 as the value of X. Adequate nutrition (see table 3).

Table 3
Model summary of the effect of adequate nutrition on weight of pre-school children in Uyo metropolis.

Model	R.	R-square	Adjusted	Std error
1	0.533	0.284	0.279	2.27462

P< 0.05; df = 148; critical r-value = 0.174

From the above table the calculated r-value 0.533 was greater than the table R-value of 0.174 at 0.05 alpha levels with 148 degree of freedom. The R- square value (coefficient) of 0.284 predicts 28% of the effect of adequate nutrition on weight of pre- school children in Uyo metropolis. With regards to the R-value of 0.533, the rate of percentage (53%) is highly positive and therefore implies that adequate nutrition has significant effect on the weight of the pre-school children in Uyo metropolis.

Hypothesis Two
The null hypothesis states that there is no significant effect of adequate nutrition on height of pre- school children in Uyo metropolis. In order to test the hypothesis independent and dependent variables were identified. The variables were subjected to simple regression analysis in order to generate the predicted (ŷ) value of y (height) for X^1 as the value of X (adequate nutrition) (see table 4).

Table 4

Model summary of effect of adequate nutrition on height of pre-school children in Uyo Metropolis.

Model	R	R-square	Adjusted R-square	Std error of the estimate
1	0.253[a]	0.064	0.058	2.18602

P< 0.05; df=148; critical R-value= 0.174

The above calculated R-value 0.253 was greater than the table R-value of 0.174 at 0.05 level with 0.148 degree of freedom. The R-square value (coefficient) of 0.064 predicts 6% of the effect of adequate nutrition on Height of pre- school children. With regard to the R-value of 0.253, the rate of percentage is lowly positive and therefore implies that adequate nutrition has positive but low significant effect on the height of the pre- school children in Uyo metropolis.

Discussion of findings

The result of data analysis in table 3 was significant due to the fact that the obtained r-value (0.284) was greater than the critical r-value (0.174) 0.05 level with 148 degree of freedom. This result implies that adequate nutrition has significant relationship with the weight of the pre-school children in Uyo metropolis. The significance of the result is in line with the opinion of Bongain et al (1998) who opined that adequate nutrition and maintenance of weight are correlates.

The result of the data analysis in table 4 was significant due to the fact that the obtained r-value (0.253) was greater than the critical R-value (0.474) at 0.05 level with 148 degree of freedom. This result implies that adequate nutrition has significant relationship with height of the pre-school children in Uyo metropolis. The significance of the result is supported by Eveleth and Tenner (1990) who said that the most important nutrition for height is protein for the pre-school children.

Conclusion

Based on the findings of the study, it was concluded that weight is obtained from the quality and quantity of nutritional intake and adequate nutrition determines the level of growth of the pre-school children.

Recommendations

From the findings, the researcher deemed it necessary to submit the following recommendations:
1. Adequate nutrition is necessary for the weight and height of the pre-school children. So, parent should not allow essential vitamins to lack in their daily meals.
2. The extent of growth in the pre-school children is based on quantity and qualities of food intake parents are advised not starve them.
3. Government should not hesitate to make cost of living to be low so that parents will be able to provide the needed balanced diet to the pre-school children as this is essential for their growth.

REFERENCES

Asanaga, A. E (2004). *Nutritional deficiency and the growth of children (0-5yrs).* A seminar paper on health Education presented in University of Uyo.

Barker, M., Jonah, B. & Daniel. H. (1991) Height and mortality in the countries of England & Wales, *Annals of human Biology*, 17 (1).

Barker, D., Simon, P. & Han, D. (1993) 6th nation wide anthropological research of children and youth in Czech Republic, *Charles University in Prague.*

Bogin, B. A. (2001). *The growth humanity Wiley-Liss*, center at fond – Parisian, Haiti.

Bongain, D., Bongain, F., Ohsum, M., Kanaya, D. & Osumi, H. (1998) *Obesity in Obstetrics and Gynecology European Journal of Obstetrics Gynecology and Reproductive Biology Mass Index in Relation to Total Mortality*.

Eveleth, P. B. & Tanner, J. M. (1990) *World Wide Variation in Human Growth*, 2nd ed. Cambridge University press.

Hendrickse, R. G. (1997). *"Of Sick turkeys, Kwashiorkor, Malaria,, Perinatal mortality, heroin addicts and food poisoning: research on the influence of aflaxines on child health in the tropics"* Ann Trop medical Prasitol 91 (7): 787.

Johnson, D. & Blasco, N. (2007) "Nutrition and convention on the rights of the child". *Food Policy.* 21: 41-55

McCarron, R., Craig, F., Braley, M. & Muir, R. (2002) Population differences in body composition in relation to the body mass index. *European Journal of Clinical Nutrition.*

Merck, D. & Merck, R. (2007) *Manual on nutrition*. On-line resources.

Miao-xin, L. (2004) Relationship of Nutrition and skin problem. *European Journal of Clinical Nutrition.*

Murray, J. E. (1997). Standards of the present for people of the past: Height, weight, and mortality among men of Amherst College. *Journal of Economic History.*

Norgan, D. (1994) The worldwide magnitude of protein-energy malnutrition: an overview from the WHO Global Database on Child Growth. *Bulletin of the World Health Organization*, 71 (6):703-712.

Piaget, B. (2002) Alcohol use and cognitive loss among employed men and women. *American Journal of Public Health* 73(5):521-526.

Piatti, P. & Caumo, D. (1994). Hypo-caloric high protein diet improves glucose oxidation and spares lean body mass: comparison to hypo-caloric high carbohydrate diet. *Metabolism*. 43 (12).

Rivera, H. (2007) Your guide to body building. Building nutrition- sample of body building diet.

Robert, D. (1978) The distribution and mortality impact of chronic energy deficiency among adult Nigerian men and women. *European Journal of Clinical Nutrition.*

Shannon, J. B. (2001) *Worldwide Health Source Book.* Detroit, MI: Omni Graphics.

Thompson, Z. (2006) *A brief theory of nutrition.* On line resources.

WHO (2000) *Malnutrition*. The Global picture www.californiprojectlean.org

WHO (2005) *World Evaluation of Nutritional Value to Human Growth*. New York.