Mother's Education and Anthropometry of Preschool Children

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Abstract
The pre-school years are the period of time before a child begins his formal education. It is a period during which development occurs at a very rapid speed which calls for intake of greater amounts of nutrients (Mishra and Gupta, 1978). Although compared with infancy the development during pre-school years is slow but the growth of the child and development of the different organs takes place in pre-school years. The present study will be an endeavour to study the anthropometric measurements of children of educated and uneducated mothers.
Keywords- *anthropometri, education.*

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Introduction

Education of women is very important predictor of the nutritional status of the children. A change in the educational level of women is perhaps a more precise indicator of social change in the society then the education of males. Education lead people to question traditional modes of thoughts and behaviour. It also helps in changing the style of life and helps women to participate more effectively in the affairs of the family. Similar other modernized effects like changing economic attitude and cost benefit considerations of children operate as intervening variable though which education effects the health and nutritional status of the children.

An estimated three quarters of all health care takes place at home, where women particularly in their role as mothers generally have responsibility for promoting their family's health and nutrition. (Joanne; 1986).

Children born of educated mothers have a lower mortality risk because educated women tend to marry and have their child at a later age than uneducated women. They also are likely to be more assertive and to play a greater part in intra family decision making in favour of their children's need. Their husband's tend to be economically better off than those of uneducated women. Educated mothers may also make earlier and more effective use of health services. It may be postulated that mother's education would affect their children's nutritional status by similar mechanisms, and various studies have shown some degree of association between mother's education and the nutritional status. (Dass. S.K; 2003).

The preschool years are the period of time before a child begins his formal education (Suitor, 1984). Preschool age is in between stages of infancy and school age. Childhood diet needs to be taken more seriously to improve the nation's health and for producing bright and active children.

Anthropometric measurements are concerned with the measurements of physical dimension of the body. Anthropometric measurements viz. height, weight and mid-upper arm circumference were used in the present study.

Physiologic growth depends on a variety of nutrients in the food a child eats. It also depends on the vast number of biochemical processes of metabolism that supply the right materials in the right place at the right time for forming and maintaining unique body tissue. Human growth and development, however, involves far more than the physical process alone. It takes in social and psychological influences and relationships- indeed, the entire environment and culture that promotes individual growth potential. (William, 1989)

Growth Patterns of preschool children

The rate of growth slows considerably after the first year of life. In contrast to the usual tripling of birth weight that occurs in the first 12 months, another year passes before the birth weight quadruples. Like-wise, birth length increases by 50% in the first year but does not double until approximately the age of 4 years. Increments of change are small compared with those of infancy and adolescence; weight typically increases an average of 2 to 3 kg (4 ½ to 6 ½ lb) per year until the child is 9 or 10 years old. Then the rate increases, signalling the approach of puberty. Height increase increments average 6 to 8 cm (2½ to 3½ inches) per year from 2 years of age until puberty. Growth is generally steady and slow during the preschool and school-age years, but it can be erratic in individual children, with periods of no growth followed by growth spurts. These patterns usually parallel similar changes in appetite and food intake. For parents, periods of slow growth and poor appetite can cause anxiety, leading to mealtime struggles.

Body proportions of young children change significantly after the first year. Head growth is minimal, trunk growth slows substantially, and limbs lengthen considerably, all of which create more mature body proportions. Because of walking and increased physical activity, the legs straighten, and the abdominal and back muscles strengthen to support the now erect child. These changes are gradual and subtle, occurring over years.

The body composition of preschool and school age children remains relatively constant. Fat gradually decreases during the early childhood years, reaching a minimum between 4 and 6 years of age. (Mahan, 2004).

Review of literature

Cornu et. al. (1995) used anthropometry for assessing the nutritional status and found that age and schooling of mother affected the anthropometric measurements of children.

Guimaraes et. al. (1999) studied risk factors in occurrence of short stature of preschool children in Sao Paulo State. Analysis showed that variable such as mother's education level was associated with preschool children short stature.

Hediger et. al. (2000) studied 7763 American children (4-71 months old) found that factors like birth weight status, early introduction of solid foods and the level of education, etc. affected the child's growth status.

Key Terms

Anthropometry - It is concerned with the measurement of the variations of the physical dimensions and the gross composition of the human body at different age levels. (Jelliffe, 1966). Anthropometric data are most valuable when they reflect accurate measurements and are recorded over a period of time. Common, valuable measurements are height, head circumference, weight, skin-fold thicknesses, and mid-upper arm circumference. (Mahan, 2004).

Mother's Education - The mothers who had passed class Vth and above were treated as educated mothers because they can read and write. They can understand the messages disseminated by radio as well as printed media. Dropouts below class Vth were treated as uneducated mothers because they were ignored and unaware of the nutritional facts.

Objective of the study

The mother's influence on the children's health is very strong and crucial to their growth and development. For this purpose, monitoring the impact of the mother's education on the health and growth rate of preschool children is one of the simplest, reliable and important parameters.

The present study will be an endeavour to determine the influence of mother's educational status on the anthropometric measurements of preschool children with the following specific objectives.

1) To study the anthropometric measurements of male and female preschool children of uneducated and educated mothers.
2) To compare the anthropometric measurements of male children of uneducated and educated mothers.
3) To comparethe anthropometric measurements of female children of uneducated and educated mothers.

Methodology

The study was conducted in Saharanpur city. A multistage sampling technique was used for the selection of the sample. The total number 296 mothers were the sample of the study.The technique used for collecting information for the present study was 'Interview Schedule' which was prepared with the consultation of experts in the subject. The data collected from the population under study was statistically treated for analysing the result. Considering the ability of variables in accordance with the objective of the study anthropometric measurements were characterised as depended variable.

Anthropometric Measurements

Nutritional anthropometry is measurement of human body at various age and levels of nutritional status. It is based on the concept that an appropriate measurement should reflect any morphological variation occurring due to a significant functional physiological change.

The measurements that are selected should be the simplest and quickest to measure, and the easiest to reproduce, providing simultaneously maximum information concerning a number of nutritional problems.

The measurement used in surveys was: (1) Body weight, (2) Crown heel length or standing height, (3) Mid-upper arm circumference.

Body Weight

Body weight is the most widely used and the simplest reproducible anthropometric measurement for the evaluation of nutritional status of young children. It indicates the body mass and is a composite of all body constituents like water, minerals, fat, protein, bone etc. Its potential is perceived not only by the health personnel, but also by the community both the educated and illiterate alike.

Technique

A platform spring balance was used for measuring weight. Indian made weighing balance calibrated in kilograms and grams was used for weighing by method described by Jelliffe (1966). This was standardize with known weights before use and kept on the flat surface. The child was made to stand barefooted on the platform of the balance without touching any other surface or object with minimum cloths and reading was noted. The pointer on the balance scale was objected to zero before each weighing.

Height

The height of an individual is influenced both by genetic (hereditary) and environmental factors. The maximum growth potential of an individual is decided by hereditary factors while the environmental factors, the most important being nutrition and morbidity determine the extent of exploitation of that genetic potential.

Technique

A vertical measuring rod with a head place was used for measuring the heights of the subjects. The subjects were asked to stand erect, without shoes with feet parallel and with the heads touching the upright rod. The head piece was lowered, crushing the hair and making contact with the top of the head. The reading was recorded to the nearest 0.5 cm.

Mid-Upper Arm Circumference (M.U.A.C.)

Poor musculature and wasting are cardinal features of protein energy malnutrition in early childhood. Mid-upper arm circumference (MUAC) is recognized to indicate the status of muscle development. The mid-upper arm is heavily muscled and approximately circular.

Technique

The mid-upper arm circumference was taken on the left hand. The mid-point between the tip of the acromion of scapula and the tip of the olecranon of the fore-arm bone, ulna, is located with the arm flexed at the elbow; and marked with a marker pen. The arm was left hanging freely and the fibre glass tape was gently, but firmly placed embracing the arm without exerting too much pressure on the soft tissues. The reading was taken to the nearest millimetre, with the tape still in position. Tailor's cloth tape is not preferred since with constant use it loses its accuracy because of wear and tear.

Body Mass index

The body mass index is a reliable indicator of nutritional status and the size of body fat stores in respondents. The BMI indicates both fat and lean tissues (James et al. 1988). The index was calculated by dividing the absolute-weight (kg) with absolute height (m) squared i.e. BMI = $Wt/Ht^2 (kg/m^2)$.

Anthropometric measurements viz. height, weight and mid-upper arm circumference were used in the present study, the results of which are discussed as under.

Impact of mother education on the anthropometric measurements of preschool children.

Mother's will not change their beliefs and habits concerning food unless they are educated. Only educated mothers know the benefits of nutritious food, good child feeding practices and improve preparation and preservation of foods. By using nutritious local foods and good feeding practices it is possible to improve health of undernourished children at little or no extra expense to the family.

Table I Anthropometric Measurements of Male and Female preschool children of uneducated mothers

Anthropometric Measurements	Children of uneducated mothers				Value of t and p	
	Male (n=44)		Female (n=55)			
	Mean	S.D.	Mean	S.D.	t	p
Height (cm)	95.66	7.62	95.82	9.64	0.090	>0.05
Weight (Kg)	14.45	2.70	14.53	2.82	0.143	>0.05
Mid upper arm circumference (cm)	17.86	1.90	16.91	1.77	2.568	<0.05
Body Mass Index (Kg/m^2)	15.78	2.36	15.86	2.61	0.158	>0.05

Values are mean ±SD.

Table I shows that mean height of male and female children of uneducated mothers was 95.66±7.62 cm and 95.82±9.64 cm, respectively. The average weight of male children of uneducated mothers was 14.45±2.70 kg and that of female children of uneducated mothers was 14.53±2.82 kg. The average mid upper arm circumference of male and female children of uneducated mothers was 17.86±1.90 cm and 16.91±1.77 cm, respectively. The mean BMI of the male and female children of uneducated mothers was 15.78±2.36 and 15.86±2.61 kg/m².

Itshows that the mean height, weight and BMI of the female children of uneducated mothers were slightly higher than those of the male children of uneducated mothers. Non-significant difference at 5 percent level of significant was observed in the height, weight and BMI among the male and female children was more than the female children. This difference was found to be significant (P<0.05).

Table II Anthropometric Measurements of Male and Female children of educated mothers

Anthropometric Measurements	Children of educated mothers				Value of t and p	
	Male (n=92)		Female (n=105)			
	Mean	S.D.	Mean	S.D.	t	p
Height (cm)	96.72	10.12	94.75	10.55	1.333	>0.05
Weight (Kg)	15.55	3.27	14.25	2.88	2.967	<0.05
Mid upper arm circumference (cm)	17.37	2.64	16.94	2.30	1.222	>0.05
Body Mass Index (Kg/m²)	16.70	2.96	16.10	3.48	1.294	>0.05

Values are mean ±SD.

According to Table II the average height of male and female children of educated mothers was 96.72±10.12 and 94.75±10.55 cm, respectively. Male and female children had an average weight of 15.55±3.27 and 14.25±2.88 kg, respectively. The mean mid upper arm circumference and BMI of male children of educated mothers was 17.37±2.64 cm and 16.70±2.96 kg/m², respectively. The average mid upper arm circumference and BMI of female children of educated mothers was 16.94±2.30 cm and 16.10±3.48 kg/m², respectively.

According to Table II Non-significant difference (P>0.05) between male and female children of educated mothers was found regarding the mean height, BMI, mid upper arm circumference. However, significant difference (P<0.05) regarding the weight was observed among the male and female children of educated mothers.

Table III Anthropometric Measurements of Male children of uneducated mothers and educated mothers

Anthropometric Measurements	Male Children of				Value of t and p	
	Uneducated mothers (n=44)		Educated mothers (n=92)			
	Mean	S.D.	Mean	S.D.	t	p
Height (cm)	95.66	7.62	96.72	10.12	0.616	>0.05
Weight (Kg)	14.45	2.70	15.55	3.27	1.938	>0.05
Mid upper arm circumference (cm)	17.86	1.90	17.37	2.64	1.102	>0.05
Body Mass Index (Kg/m²)	15.78	2.36	16.70	2.96	1.711	>0.05

Values are mean ±SD.

Table III presents that average height, weight, mid upper arm circumference and BMI of male children of uneducated mothers was 95.66±7.62 cm, 14.45±2.70 kg, 17.86±1.90 cm and 15.78±2.36 kg/m², respectively. The mean height, weight, mid upper arm circumference and BMI of male children of educated mothers were 96.72±10.12 cm, 15.55±3.27 kg, 17.37±2.64 cm and 16.70±2.96 kg/m², respectively.

The mean height, weight and BMI of male children of educated mothers were higher than the male children of uneducated mothers. The mean mid upper arm circumference of male children of uneducated mothers was higher than the male children of educated mothers. When computed statistically, the difference between the mean anthropometric measurements of the male children of educated and uneducated mothers were not found significant even at 5 percent level of significance.

This might be due to knowledge of educated mothers regarding the benefits of nutritious food and as a result higher intake of nutrients by the male preschool children of educated mothers.

Table IV Anthropometric Measurements of Female children of uneducated mothers and educated mothers

Anthropometric Measurements	Female Children of				Value of t and p	
	Uneducated mothers (n=55)		Educated mothers (n=105)			
	Mean	S.D.	Mean	S.D.	t	p
Height (cm)	95.82	9.64	94.75	10.55	0.627	>0.05
Weight (Kg)	14.53	2.82	14.25	2.88	0.588	>0.05
Mid upper arm circumference (cm)	16.91	1.77	16.94	2.30	0.085	>0.05
Body Mass Index (Kg/m²)	15.86	2.61	16.10	3.48	0.467	>0.05

Values are mean ±SD.

Table IV shows that mean height of female children of uneducated and educated mothers was 95.82±9.64 and 94.75±10.55 cm, respectively. The average weight of female children of uneducated and educated mothers was 14.53±2.82 kg and 14.25±2.88 kg, respectively. The average mid upper arm circumference of female children of uneducated and educated mothers was 16.91±1.77 and 16.94±2.30 cm, respectively. The mean BMI of the female children of uneducated and educated mothers was 15.86±2.61 and 16.10±3.48 kg/m², respectively.

According to the Table the mean height and weight of the female children of educated mothers were lower the female children of uneducated mothers. The mean BMI and mid upper arm circumference of the female children of educated mothers was found more than the female children of uneducated mothers. Through statistically the difference between the anthropometric measurements of the female children of educated and uneducated mothers were not significant even at 0.05 level. Height may be affected by genetic factors and weight due to frequent illness due to infection or infestation.

Conclusion

The findings on anthropometric measurement of preschool children gives the clear picture of the effect of mother's education. The results document that male children of educated mothers had height and weight more than the male children of uneducated mothers. A similar trend was reported by Cornu et. al. (1995) that schooling of mothers effected the anthropometric measurements of the children.

Association of maternal education with child survival and growth and development is consistent and strong. Educated women make better use of health services, provide better child care including feeding, have more hygienic households, have better knowledge of appropriate child rearing, are more assertive and more likely to change their beliefs. Women's autonomy and status and her control over whatever she earns, also correlates with the better nutrition and growth of the child. So it is obvious that nutrition and growth of child is not just a matter of food and income but to several socio-cultural and educational influences as well (Sachdev, H.P.S., 1995).

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