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UNDERWEIGHT CHILDREN AND THEIR ENROLMENT IN PRE-SCHOOL EDUCATION IN KENYA

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Abstract: *This study sought to determine the nutrition status of children in terms of underweight and its relationship to children's enrolment in pre-school education. Probability sampling was used to get the sample size. The sample size for this study was 390 children. The findings indicate that statistically, there is no significant relationship between nutritional status in terms of underweight and enrolment in pre-school (p = 0.485> 0.05). This means that being underweight is not related to enrolment in pre-school. The null hypothesis is accepted.*

Keywords: *Pre-school education, Enrolment, pre-school years, Pre-school, Education, Nursery school, Children, Underweight, Nutrition status, Anthropometric data, Diet, Age, Sex, Nutrition, Kenya*

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BACKGROUND

Children's nutritional status is important not only to children's growth and development but also it reflects household and national investments in family health (GoK, 2002). Nutritional status is the condition of health of an individual as influenced by the utilization of food taken in the body. It can be determined by a thorough physical examination of the body (Robinson 1990 & Gibson 1990). Nutritional status in this paper is measured through indices weight for age. Low weight for age (underweight) is an indication of acute malnutrition. This paper will explore underweight in relation to enrolment in pre-school, particularly for those not attending pre- school.

Nearly 800 million people world-wide did not have sufficient food, and approximately 500 million suffered from chronic malnutrition (UNICEF, 1998). That was then now we are in 2009, which is 11 years later but, the same might be evident today. Malnutrition is reflected through wasting and more specifically underweight which is a result of long-term food shortage in the body (Moock & Leslie, 1986). Prolonged food shortage gives rise to protein energy malnutrition deficiency (ACCN/SCN 1998; Suarez & Jose 2006). In Kenya, more than one-third of children did not receive adequate food supply in 1990 (Silkind, 1990). Even though it is 22 years today, it may be true that children in Kenya are not getting adequate food. When children do not get sufficient food, it means that they have low nutritional status (underweight); low weight for age (Schumacher, 1995 and Applied Nutrition Program, 2000). This means that pre-school age going children have low nutritional status. This paper will explore pre-school enrolment in relation to underweight children.

Some studies have shown that children's nutritional status is affected by lack of planning by parents (Piwoz &Preble, 2000). Swadener (1995) shows that, mothers are aware of the young children's nutritional needs, but they do not plan on how to meet them. In Kenya, it was expected that mothers through the training given during the health score card record checkups for their children, they know that children should be provided with a balanced diet but due to lack of planning to offer a balanced diet, they end up providing their children with an unbalanced diet which led to low nutritional status of their children. Now that it is evident from those studies that children in Kenya are not taking a balanced diet, this study will further establish these children's nutrition status in terms of underweight and then

establish the relationship between underweight and children's enrolment in the pre-school education in Kenya.

METHODOLOGY

This study was a correlation study employing a survey method. The independent variable was children's nutrition status in terms of underweight and the dependent variable was children's enrolment in the pre-school education. The variable underweight among the pre-school age going children was measured by taking the measurements of children's nutritional status. Indices weight-for-age (underweight) was used to classify the nutritional status of pre-school age going children. To establish nutrition status of the pre-school age going children in terms of underweight, the cut of point used in the study were; >-3 S.D for severe, < -3.0 & < -2.0 S.D for moderate and > -2.0 S.D for normal. To establish the relationship between underweight and enrolment in pre-school education, the nutritional status in terms of underweight for children enrolled in pre-school education and children not enrolled in pre-school education was correlated

The null hypothesis was tested at a significance level of 0.05: The null hypothesis stated that:

H_{01}. There is no significant relationship between underweight and enrolment in pre-school.

Anthropometric measurements were taken by asking the mother to give the child's age which was also verified by using the growth monitoring clinic card or the birth certificate. Where age of the child was not known, estimated date of birth was done using parents' estimates or local events (FSAU, 2003). Weight was taken using an electronic bathroom scale calibrated up to 120kg at the interval of 0.1kg children. The bathroom scale was placed on a flat surface; the child was lightly dressed and stood on the scale. When the pointer became stable, the weight was taken to the nearest 0.1kg the reading was taken twice. The average was calculated and recorded (Cogill, 2000 and FSAU, 2003). Descriptive statistics calculated included: frequencies, means, standard deviations and percentages.

In inferential statistics, Pearson Chi-square (χ^2) for testing the relationship between variables was used to test the statistical hypothesis. Pearson Chi-square (χ^2) was used to test the relationship between variables in Ho_1. Pearson Chi-square (χ^2) was found appropriate to test the relationship between variables in Ho_1 first, because it is used to test the relationship between variables and second, because variables in the hypothesis are

categorical (either ordinal or nominal) whereby in Ho_1, pre-school enrolment was a nominal variable, anthropometric measurements; sex and weight were also nominal variables, while age was an ordinal variable.

Anthropometric data were analyzed using the Nutrition Package EPI INFO 2005, where by the raw data on weight and age were transformed to nutrition indices (Z-score values) by the EPI INFO (2005) computer software. To determine the nutritional status of children's; weight for age Z-scores were computed and the cut-off points that were used to determine the nutritional status were; < -3 S.D for severe, > -3.0 & < -2.0 S.D for moderate and > -2.0 S.D for normal

The null hypothesis tested at a significance level of 0.05 was:

H_{01}. There is no significant relationship between nutritional status in terms of underweight and children's enrolment in pre-school.

Information on the Nutritional Status (Anthropometric Measurement)

To establish children's nutritional status; their sex was taken, age and weight as indicated in table 1, 2, 3 and 4

Table 1: Sex of the Children

Sex of the child	Frequency	Percentage
Male	184	47.2
Female	206	52.8
Total	390	100

Table 1 shows that among the 390 pre-school ages going children who participated in the study in were both boys and girls. The sex of children and enrolment in pre-school is indicated in Table 2.

Table 2: Sex of Children and Enrolment in Pre-School

Sex of the child			**Total**
Children's enrolment in pre-school	Boys	Girls	
Attending	96	99	195
Percentages	49.2%	50.8%	100.0%
Not attending	88	107	195
Percentages	45.1%	54.9%	100.0%
Total	184	206	390
Percentages	47.2%	52.8%	100.0%

Table 2 shows that 96 (49.2%) of children attending pre-school were boys and 99 (50.8%) of them were girls. This means that more girls than boys attended pre-school even though the difference is minimal. The table also indicates that among the children not attending pre-school the number of girls was higher 107 (54.9%) than that of boys, 88 (45.1%). There were more girls 206 (52.8%) than boys 184 (47.2%) among pre-school age going children Children's age in months is indicated in Table 3.

Table 3: Children's Age in Months

Mean	60.469
Median	60.000
Mode	72.0
Std. Deviation	10.7585
Range	48.0
Maximum	72.0

According to table 3, children's age average was five years (60.5 months); many children were 72 months old (6years) and were also the oldest. Children's weight is indicated in table 4.

Table 4 Children's Weight (N= 390)

	Childs Weight (Kg)
Mean	17.781
Median	18.000
Mode	16.0
Std. Deviation	3.0778
Range	26.0
Maximum	28.0

Table 4 shows that children's average weight was 17.8 kilograms. Most children were 16 kg's. The children's maximum weight was 28kgs. This information is categorized and summarized into nutritional status in terms of underweight and the cut-off points that are used to establish this nutritional status in table 4. The same information is further clarified in Figures 1. Children's nutritional status in terms of stunting is further characterized into three groups; the normal, the moderate and the severe as indicated in table 5

Table 5: Nutritional Status (Weight for Age Z Scores) (Underweight)

Nutritional status	Frequency	Percent
Normal (Z ≥ -2)	355	91.0
Moderate (-3 ≤ Z ≤ -2)	23	5.9
Severe (Z ≥-3)	12	3.1
Total	390	100.0

< Means less than, ≥ Means greater than or equal to, ≤ Means less than or equal to.

From table 5 it is shown that among the 390 pre-school age going children in the study many of them 355 (91%) were normal, 23 (6%) of them were moderately underweight and only 12 (3.1%) were severely underweight. The information from in table 5 is explained in figure 1.

Figure 1: Distribution of Weight for Age Z Scores

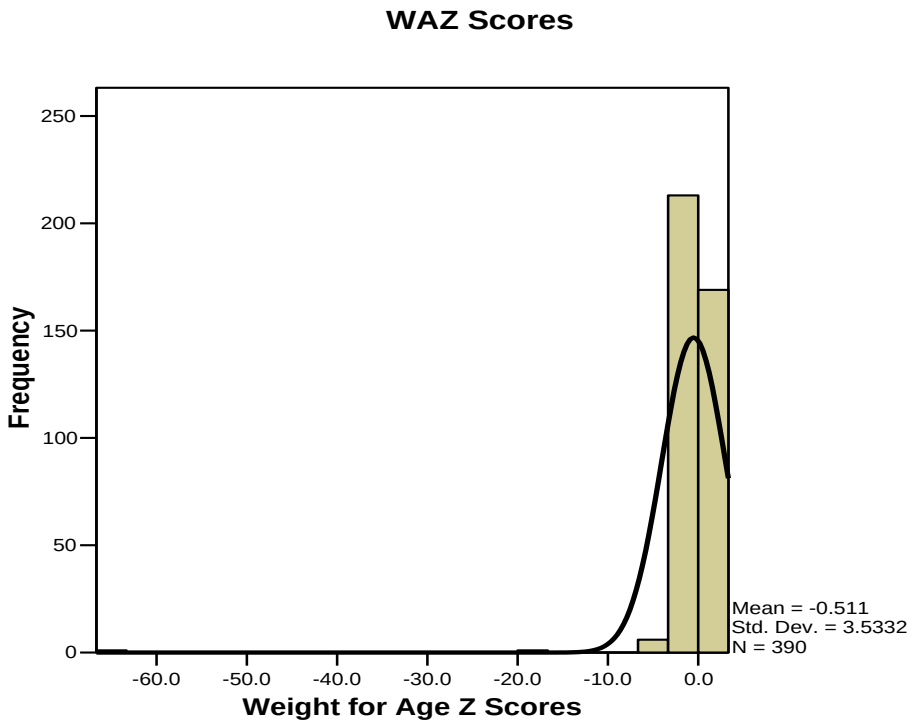

Figure 1 shows an almost normal distribution but skewed to the left. Almost because the normal distribution curve does not show the two tails meaning there is skewed-ness towards the lower Z scores. Children's nutritional status in terms of underweight is further characterized into three groups; the normal, the moderate and the severe as indicated in table 6.

Nutritional Status Measured by Taking Indices Weight for Age (Underweight)

Pearson Chi-square (χ^2) test was used to determine the relationship between the independent variable nutritional status in terms of underweight and enrolment in pre-school. Nutritional status in terms of weight for age (underweight-WAZ) is indicated in table 6.

Table 6 Nutritional Status in Terms of Weight for Age (Underweight-WAZ)

		Nutritional status (underweight-WAZ)			
		Normal (Z ≥ -2)	Moderate (-3 ≤ Z ≤ -2)	Severe (Z ≥-3)	Total
Children's enrolment in pre-school	Attending	175	12	8	195
	Percentages	89.7%	6.2%	4.1%	100.0%
	Not attending	180	11	4	195
	Percentages	92.3%	5.6%	2.1%	100.0%
	Total	355	23	12	390
Percentages		91.0%	5.9%	3.1%	100.0%

The table 6 shows that among the 195 pre-school age going children that attended pre-school, many of them 175 (90%) were normal, 12 (6%) of them were moderately underweight and 8 (4%) were severely underweight. Among the 195 children who did not attend pre-school, many of them 180 (92%) were normal, 11 (6%) of them were moderately underweight and 4 (2%) were severely underweight. Among the 390 pre-school age going children, 355 (87%) of them were normal, 23 (6%) of them were moderately underweight and 12 (3%) were severely underweight. Chi-square test for underweight and enrolment in pre-school is indicated in table 7

Table 7: Chi-square Test for Underweight and Enrolment in Pre-school

	Calculated (χ^2) Value	Critical (χ^2) Value	df	Sig. level (2-sided)
Pearson Chi-square (χ^2)	1.447(a)	5.991	2	0.485

Table 7 indicates that statistically, there is no significant relationship between nutritional status in terms of underweight and enrolment in pre-school (p = 0.485> 0.05). This means that being underweight is not related to enrolment in pre-school. The null hypothesis is accepted.

The findings of this study agree with works closely related to this study by Alderman *et al.,* (2004) which indicated that there was no significant relationship between anthropometric indexes; weight for age (underweight) and education of parents. The findings also agree with closely related findings of a study by Maria (2002) which reported that there was no significant difference in underweight between low academic achievers and high academic achievers. This finding disagrees with closely related findings of a study carried out by Maria (2002) to determine the cognitive abilities of Kenyan children in relation to nutrition, family characteristics and education; found that underweight had significant relationship to performance. The findings of this study are also closely related to the works of Abidoye & Eze (2000) who carried out a study on comparative school performance through health and nutrition in Nigeria and found that nutritional status in terms of underweight significantly affects school performance.

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