A Critical Analysis Of Gender As A Correlate Of Nutritional Health Status Of Early Childhood And Preschool Children Aged 1-5 Years In Akwa Ibom State

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ABSTRACT

The study assessed the gender as a correlate of nutritional health status of early childhood and preschool children aged 1-5 years in Akwa Ibom State. In carrying out the study, a cross-sectional survey design was adopted as the study. The study was conducted in Akwa Ibom State, Nigeria. The targeted population for the study comprised school children registered in government approved nursery and primary schools aged 1-2 years and 3-5 years in Akwa Ibom State. Multi stage sampling procedure was used to draw a total of 1440 pupils from urban and rural nursery/primary schools in Akwa Ibom State Senatorial districts. Data for the study were collected using standardized instruments and proforma for anthropometric assessment. Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. No test of reliability was done since the instruments were standardized. The researcher subjected the data generated for this study to appropriate statistical techniques such as descriptive statistics meant to answer the research questions and simple regression analysis meant to test the hypothesis. The test for significance was done at 0.05 alpha levels. The study concluded that it is important that children not only acquire knowledge about adequate nutrition but also develop good eating habits that would enhance their growth and development. It includes proper intake of food, liberation of energy, elimination of wastes and the biochemical syntheses that are essential for maintenance of normal growth and development. One of the recommendations made was that since the goal of every health practitioner is to maintain a high level of nutritional health status for the population, the hospitality industry should always go for regular checkup using anthropometric indicators such as weight for height (W/H), weight for age (W/A) and height for age (H/A) to characterize the nutritional status of populations.

Keywords: Gender, Nutritional Health Status, Early Childhood, Preschool Children and Akwa Ibom State

Introduction

According to the Federal Republic of Nigeria (2023), children aged 1-2 years are meant for early childhood and children aged 3-5 years are for pre-primary school education and are generally termed "preschool children." The categorization of school children in Nigeria by the National Policy on Education serves as the guiding principle for this present study (Utomi, 2022). At this age, it is said that the physical attributes of these age groups at this stage of life include rapid growth in stature, muscle mass and fat mass which gear them optimally into achievable adolescence. It is, however clear that; their nutritional status during this period is an important determinant of their health status. Thus, the nutritional health status of children in this age bracket determines, to a large extent, their growth rate and development.

Variations in the normal stature of children within these age brackets can occur as a result of certain factors. Indicators of adequate nutrition, according to the National Nutrition Monitoring Bureau (2021), are often related to the individual's level of knowledge, household food habits, general lifestyle, and physical makeup. Children generally need the same kinds of nutrients, but the amount needed may vary with age, sex, socio-economic status, living conditions, occupations, birth orders, religious background, and the general lifestyles of the parents or caregivers (Diamerit, 2016). These factors may be related to family size, level of education of parents, level of dietary intake and gender discrimination. The WHO reference standards most commonly used to standardize measurements were developed by the US National Center for Health Statistics (NCHS) and are recommended for international use by the World Health Organization (WHO). Available evidence suggests that children from well-nourished and healthy families throughout the world grow at approximately the same rate and attain the same height and weight as children from industrialized country (Lelijveld, Benedict, Wrothesley & Mates, 2022). The NCHS/WHO reference standards are available for children up to the age of 18 years, but this study will focus on children aged 1 to 5years. The international reference standards can therefore be used for standardizing anthropometric data from around the world. As part of a public health programme, it is important to monitor the weight and height measurements of school children. It is with this background that this study is designed to determine the nutritional health status of early childhood and preschool children in Akwa Ibom State using vertical anthropometric methods of growth monitoring. The variables considered include age, gender, and location of the early childhood children aged 1-2 years and preschool children aged 3-5 years.

Statement of Problem

At this time, children generally are expected to grow and develop well-formed muscle mass and thick bones for future growth into healthy adolescence and adulthood. Unfortunately, many early childhood and preschool children develop low resistance to infection and become sickly. It is quite obvious that the effects are reflected in the weight, height, body mass index, mid upper arm and head circumferences of these children. The researcher is worried that if this ugly situation is not suitably addressed, the future of many children will be adversely affected with enormous harm to the development of Akwa Ibom State. In Nigreia, only few studies known to the researchers were done on anthropometric assessment of the nutritional status of children. 0nly a few studies have been done on gender differences in the level of undernutrition and over nutrition among children and adolescents.

Objective

1. Urban and rural children aged 1-2 years with weight, height, mid-upper arm and head circumference measurements in line with recommended WHO/NCHS standard.
2. Urban and rural preschool children aged 3-5 years with weight, height, mid-upper

arm and head circumference measurements in line with recommended WHO/NCHS standard.

Research question

1. Urban and rural children aged 1-2 years with weight, height, mid-upper arm and head circumference measurements in line with recommended WHO/NCHS standard.
2. Urban and rural preschool children aged 3-5 years with weight, height, mid-upper arm and head circumference measurements in line with recommended WHO/NCHS standard.

Hypothesis

1. Weight, height, mid-upper arm and head circumference measurements of children aged 1-2 years do not depend significantly on their gender.
2. Weight, height, mid-upper arm and head circumference measurements of pre-school children aged 3-5 years do not depend significantly on their gender.

CONCEPTUAL REVIEW

Preschool Children

Philips (2020) described preschool children as children aged 3-5 years who are different from toddlers in that they are developing the basic life skills, independence and knowledge that they will need as they enter the school years. It is generally a period where all developmental milestones are displayed. At this age, children eat meals, watch television, and play with equipment like balls and plastics. According to Philips, children at this age need adequate nutrients to keep them strong to face their developmental tasks. Any deviation in the provision of adequate meals can result in poor growth and development as well as an inability to cope with subsequent stages of life.

The National Association for the Education of Young Children (2022) explained pre-school children as a term used to describe children raised from about 3 to 5 years of age, that is, those who have moved beyond toddlerhood but are not yet school age. Child nutrition report (2021) stated that the consequences of poor diets hit the young children severely. Children under five years are commonly seen with stunting, wasting, overweight and obesity. According to the report, children living in the rural areas are significantly fed with poor diets compared to the wealthier urban peers. In addition, preschool children are children between the ages of 3 and 5 who are still developing their eating habits and need encouragement to eat healthy meals and snacks. Preschool children are usually considered one of the groups at greatest nutritional risk. Malnutrition affects the rate of morbidity and mortality among young children and poses a threat to their physical and mental development. According to Pellitier, Frongillo, Schroeder and Habicht (2015), poor nutritional status among preschool children accounts for a disproportionately large share of deaths in most developing countries, including Nigeria and Akwa Ibom State in particular.

Growth Monitoring

Growth monitoring is the continuous process of weighing children, taking their heights and other measurements into consideration and comparing the values obtained with standards (Appendix 4A-4M, Page 186-203) in order to determine the child's nutritional status (Ani 2010). It has been advocated worldwide as one of the key elements of child survival and primary health care strategies. Saracho (2021) asserted that growth monitoring is often used as an excellent tool for assessing the growth and development of a child in order to detect the earliest changes and match them with appropriate responses to ensure that growth continues uninterruptedly. He further added that nutrition plays an important role on the child's development, behavoiur and performance. This is usually backed up by the following theories namely maturationist, constructivist, behavioral, psychoanalytic, and ecological. Growth monitoring is used to assess the growth rate of a child by periodic and frequent anthropometric measurements in comparison to a standard (Melkamu, Bitew, Muhammad & Hunegnaw, 2019).

Liu, Long and Garner (2017) asserted that growth monitoring and promotion (GMP) comprises: measurement (the regular recording

of a child's weight and sometimes their height); assessment (plotting weight against age or weight against height on a growth chart; analysis (interpreting the growth pattern of the child); action related to the analysis (for example, counselling, providing nutritional supplements or examining the child for disease) However, it is internationally adopted as an operational strategy for enabling mothers to visualize growth or lack of growth among children and to receive specific guidelines on how a family and country can act to maintain health and continue growth in a child (WHO, 2010).

Anthropometric Methods of Nutritional Assessment of Early Childhood and Preschool Children

Determination of the nutritional status of the child by using nutritional anthropometric indicators of growth has been used not only to provide information on the nutritional and health status of children, but as an indirect measure of the quality of life of the entire community. Itona (2021) asserted that routine growth measurement is a widely accepted practice considered to be an integral part of routine pediatric health care. He further explained that the commonly used anthropometric indices or measurements for nutrition surveillance are weight for height and length (WFH/L) (wasting); mid upper arm circumference (MUAC) (acute malnutrition); oedema; height-for-length-for-age (stunting); and weight-for-age (underweight). Other less common indices or measurements include weight, height, birth weight, triceps skin fold thickness (TSF) for age, sub scapular skin fold (SSF), head circumference, and muscular circumference. Weight for age measurement is the most potent tool for assessing the current nutritional status of a child, provided the actual age is known.

According to Fenhang, et al (2016) anthropometric measurements of height, weight, and waist circumference components are the most frequently used techniques for the assessment of growth and nutritional status among children. Best (2020) opined that accurate measurement of patients' weight and height is an essential part of nutritional assessment but may also inform other aspect of care. Therefore, standardization of measurement procedures is essential to obtain reliable and comparable anthropometric data from different geographical/jurisdictional regions. Weight for age is the most sensitive method which incorporates both linear and body proportion and identifies children who are underweight. It identifies chronic as well as acute undernutrition which is usually performed by using a beam weighing scale or a portable bathroom scale (Hansen model) for children who can stand. In the case of infants, weighing scales balanced with suspended bags are used.

According to WHO (2022), weight for height measurement is one of the methods used to determine the nutritional health status of a child. The weight of a child has to be related to his height in order to obtain an objective measurement of that child's degree of thinness and growth. WHO (2021) asserted that weight for height is more specific than the measurement of weight alone, which does not distinguish between tall, thin, and short children. This is the reason why weight for height will be used in this present study. For height measurement, the child must be over 2 years of age for an accurate result (Norton, 2019). Weight for height indices are used for children over the age of two to indicate wasting or acute undernutrition, whereas weight for length indices are used for children under the age of two. Uppal, Kumari, and Sidhu (2005) asserted that weight for height measurements are sensitive to acute growth disturbances like wasting or thinness and indicate recent severe processes of weight loss associated with unfavorable conditions. The height of an individual is measured in centimeters. After taking both weight and height, the values are calculated to obtain the body mass index to determine whether the value is desirable or not.

Length Measurement:

For infants and pre-school children below the age of 2 years, the length of the child is best used when lying down. This is because standing height measurement is impossible and is usually inaccurate with such young children who may be uncooperative. Toddlers and young

children need adequate and diverse diets to provide all the nutrients required for optimal growth and development.

Height for Age

Casadei & Kiel ((2022) opined that height for age reflects linear growth and can identify long-term growth interceptions or stunting. The worldwide prevalence rate of height for age shows considerable variation, ranging from 5 percent to 65 percent among less developed countries. Abolurin, Oyalemi, Oseni, Akinlosotu, Sodende, & Adekoya (2021) explained that children who are between six and twenty-four months old were likely to be under nourished if any of the underweight, stunting and wasting was present due to poor breastfeeding practices. It was further explained that to overcome low height for age, exclusive breastfeeding should be carried out by mothers to reduce the risk of undernutrition. In older children, low height-for-age reflects a state of having failed to grow or being stunted.

Mid-Upper Arm Circumference (MUAC)

Mid Upper Arm Circumference according to Jellife (2016) is usually carried out to estimate skeletal muscle mass and fat stores using a flexible, non-elastic measuring tape. The measurement is usually taken sin centimeters with the non-elastic tape placed firmly on the left mid-upper arm at the midpoint between the acromion process of the scapular (tip of the shoulder joint) and the olecranon process of the ulna bone (tip of the elbow joint). Olise (2012) stated that the device for the measurement is called Shikir's strip (Appendix F, page 205 -206) named after the person who developed the technique. In this study, the procedure will be explained to the mother of the baby. This is about 1cm or less. Various types of the strips are now available with varying degrees of complexity. It can be made locally using old x-ray film after washing off the dye

Head Circumference

Head circumference is a valuable tool that is used to detect previous intra-uterine and early childhood malnutrition. At birth, the head circumference of a baby is between 34cm and 36cm. Arendse, Brit, Lambert and Gibbon (2022) asserted that during the past decade, research in developed and developing countries has shown that the international growth standards overestimated stunting and wasting when compared with population specific growth references He further opined that at monthly intervals, the head circumference increases by 1-2cm during the first quarter of life; by this time the baby is a year old. According to Arendse, et al. growth standards from the WHO multi center growth study are used to interprete growth parameters in terms of newborns and preschool children. This occurs if the baby has been adequately fed and lived in a sanitary condition. The use of a non-adhesive, flexible fibre will rule out congenital abnormalities such as hydrocephaly and microcephally. The measurement is usually done by placing the tape above the supra-orbital ridge and around the back of the head above the ears to give the greatest circumference (Arisoy, 2015).

Studies on nutritional health status of early childhood and preschool children outside Nigeria

Household income level was related to Weight for Height (WFH) status but not Height for Age (HFA). Children from lower income households were seen to have high WFH more than those from higher income households (P for trend = 0.038). Household income status was also significantly related to the risk of inadequate intake of micronutrients such as thiamine (P for trend = 0.032) and vitamin C (P for trend = 0.002), showing higher odds of inadequate intakes in children from lower income households. It was concluded that children from higher income households were prone to overweight due to inadequate intake of micronutrients such as thiamin and vitamin C. It was recommended that collective health action in the public sector be required from early life to reduce nutritional and health disparities among growing children. The study focused on children aged 1-5 years which is similar to the present study. It adopted the same multistage sampling technique. On the other hand, the study differed from the present study by using a structured questionnaire and multiple logistic

regression models for gender, age, region and energy intake.

In addition, Mangal, Ahmadzai and Janatzai (2021) conducted a cross sectional study among children aged 6-59 months in Paktia regional hospital, Afghanistan. A total 400 children were drawn for the study. Data were collected using a structured questionnaire and anthropometric measurement. Interview was conducted with parents/ caretakers of the children to fill the questionnaire. SPSS version 25.0 statistics software was used for the analysis. Cross tabulation and logistic regression analyses were conducted to identify factors associated with the nutritional status of the children. The result stated that statistical association was declared significant if p-value was less than 0.05.

Methodology

In carrying out the study, a cross-sectional survey design was adopted as the study. The study was conducted in Akwa Ibom State, Nigeria. The targeted population for the study comprised school children registered in government approved nursery and primary schools aged 1-2 years and 3-5 years in Akwa Ibom State. Multi stage sampling procedure was used to draw a total of 1440 pupils from urban and rural nursery/primary schools in Akwa Ibom State Senatorial districts. Data for the study were collected using standardized instruments and proforma for anthropometric assessment. Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. No test of reliability was done since the instruments were standardized. The researcher subjected the data generated for this study to appropriate statistical techniques such as descriptive statistics meant to answer the research questions and simple regression analysis meant to test the hypothesis. The test for significance was done at 0.05 alpha levels.

Results and discussions

Research Question One

What are the percentages of urban and rural children aged 1-2 years with weight, height, mid-upper arm and head circumference measurements in line with WHO/NCHS recommended standard?

Table 1

Percentages of Urban and Rural Children Aged 1-2 years with Weight, Height, Mid-upper Arm and Head Circumference Measurements in line with WHO/NCHS Recommended Standard

Location	In Line		Not in Line		Total	
Weight Measurements (WHO/NCHS Standard = 8.9kg-12.5kg)						
	f	**%**	**f**	**%**	**f**	**%**
Rural	34	15.2	90	40.2	124	55.4
Urban	54	24.1	46	20.5	100	44.6
TOTAL	**88**	**39.3**	**136**	**60.7**	**224**	**100**
Height Measurements (WHO/NCHS Standard = 49.9cm-86.9cm)						
	f	**%**	**f**	**%**	**f**	**%**
Rural	8	3.6	16	51.8	124	55.4
Urban	22	9.8	78	34.8	100	44.6
TOTAL	**32**	**13.4**	**194**	**86.6**	**224**	**100**
Mid Upper Arms Measurements (WHO/NCHS Standard = 13.5cm-17.5cm)						
	f	**%**	**f**	**%**	**f**	**%**

Rural	94	42.0	30	13.4	124	55.4
Urban	80	35.7	20	8.9	100	44.6
TOTAL	**174**	**77.7**	**50**	**22.3**	**224**	**100**

Head Circumference Measurements (WHO/NCHS Standard = 45cm-48cm)

	f	%	f	%	f	%
Rural	98	43.8	26	11.6	124	55.4
Urban	62	27.7	38	16.9	100	44.6
TOTAL	**160**	**70.5**	**64**	**29.5**	**224**	**100**

The results in Table 1 showed that out of the 224 pupils aged 1-2years in rural location, 34(15.2%) of them had their weights in line with WHO recommended standard, while those of 90 (40.2%) were not. In the urban location, 54 (24.1%) of them had their weights in line with WHO recommended standard, while those of 46 (20.5%) were not. For height measurements, 8(3.6%) of them had heights in line with WHO recommended standard, while those of 116(51.8%) were not. In the urban location, 22 (9.8%) of them had their heights in line with WHO recommended standard, while those of 78 (34.8%) were not. For mid upper arm measurements, 94 (42.0%) of them had their mid upper arm measurements in line with WHO recommended standard, while those of 30 (13.4%) were not. In the urban location, 80 (35.7%) of them had their mid upper arm measurements in line with WHO recommended standard, while those of 20 (8.9%) were not. For head circumference, 98 of them representing 43.8 percent had their head circumference in line with WHO recommended standard, while those of 26 (11.6%) of them were not. In the urban location, 62 (27.7%) of the pupils had their head circumferences in line with WHO recommended standard, while those of 38 (16.9%) were not.

Research Question Two

What are the percentages of urban and rural preschool children aged 3-5 years with weight, height, mid-upper arm and head circumference measurements in line with WHO/NCHS recommended standard?

Table 2: Percentages of Urban and Rural Preschool Children Aged 3-5 Years with Weight, Height, Mid-upper arm and Head Circumference Measurements in line with WHO/NCHS Recommended Standard.

Location	In Line		Not in Line		Total	
Weight Measurements (WHO/NCHS Standard = 14.5kg-18.5kg)						
	f	**%**	**f**	**%**	**f**	**%**
Rural	230	18.9	364	29.9	594	48.8
Urban	390	32.1	232	19.1	622	51.2
TOTAL	**620**	**51.0**	**596**	**49.0**	**1216**	**100**
Height Measurements (WHO/NCHS Standard = 94.2cm-109.2cm)						
	f	**%**	**f**	**%**	**f**	**%**
Rural	419	34.4	175	14.4	594	48.8
Urban	470	38.7	152	12.5	622	51.2
TOTAL	**889**	**73.1**	**327**	**26.9**	**1216**	**100**

	Mid Upper Arms Measurements (WHO/NCHS Standard = 13.5cm-17.5cm)					
	f	**%**	**f**	**%**	**f**	**%**
Rural	342	28.1	252	20.7	594	48.8
Urban	400	32.9	222	18.3	622	51.2
TOTAL	**742**	**61.0**	**474**	**39.0**	**1216**	**100**

	Head Circumference Measurements (WHO/NCHS Standard = 49cm-51cm)					
	f	**%**	**f**	**%**	**f**	**%**
Rural	268	22.0	326	26.8	594	48.8
Urban	304	25.0	318	26.2	622	48.8
TOTAL	**572**	**47.0**	**644**	**53.00**	**1216**	**100**

The results in Table 2 show that for pupils aged 3-5 years, out of the 594 pupils in rural location, 230 (18.9%) of the pupils had weight in line with WHO recommended standard, while those of 364 (29.9 %) were not. In the urban location, 390 (32.1%) of the pupils had their weights in line with WHO recommended standard, while those of 232 (19.1%) were not. For their heights, 419 (34.4%) of the pupils had their heights in line with WHO recommended standard, while those of 175(14.4%) were not. In the urban location, 470 (38.7%) of the pupils had their heights in line with WHO recommended standard, while those of 152(12.5%) were not. For their mid upper arm measurements, 342 (28.1%) of them had their mid upper arm measurements in line with WHO recommended standard, while those of 252 (20.7%) were not. Four hundred (32.9%) of the pupils in urban location had their mid upper arm measurement in line with WHO recommended standard, while those of 222 (18.3%) were not. For head circumference, 268 (22.0%) of the pupils had their head circumference in line with WHO recommended standard, while those of 326 (26.8%) were not. In the urban location, 304 pupils representing 25.0 percent had their head circumferences in line with WHO recommended standard, while 318 (26.2%) were not in line with WHO recommended standar

Hypotheses Testing

Hypothesis One

Weight, height, mid-upper arm and head circumference measurements of children aged 1-2 years do not depend significantly on their gender.

Table 3: Summary of t-test Analysis of Weight, Height, Mid upper Arms and Head Circumference of Children Aged 1-2 years Based on Gender

Location	N	$\overline{X}$	SD	df	t-cal.	p-value	DECI
Weight Measurements							
Male	108	10.18	.87				
				222	7.73*	.000	S
Female	116	11.09	.89				
Height Measurements							
Male	108	85.11	1.38				
				222	3.17*	.002	S
Female	116	84.35	2.11				
Mid Upper Arm Measurements							

Male	108	14.33	.80				
				222	.91^	.366	NS
Female	116	14.23	.85				
			Head Circumference Measurements				
Male	108	46.90	.89				
				222	1.62^	.108	NS
Female	116	46.71	.87				

S Signifies P<0.05; and Significant
NS Signifies P>0.05; and Not-Significant

In table 3, the summary of t-Test Analysis of weight, height, mid upper arm and head circumferences of children of the study aged 1-2 years based on their gender.

The table shows that their weight and height measurements depended significantly on gender, while their mid upper arm measurements and head circumference did not p>.05.

Hypothesis Two

Weight, height, mid-upper arm and head circumference measurements of preschool children aged 3-5 years do not depend significantly on their gender.

Table 4: Summary of t-test Analysis of Weight, Height, Mid upper Arms and Head Circumference Measurements of Preschool Children Aged 3-5 years Based on Gender

Gender	n	$\overline{X}$	SD	df	t-cal.	p-value	DECI
			Weight Measurements				
Male	636	14.56	2.18				
				1214	6.69*	.000	S
Female	580	15.49	2.66				
			Height Measurements				
Male	636	99.11	4.53				
				1214	9.45*	.000	S
Female	580	101.83	5.49				
			Mid Upper Arms Measurements				
Male	636	13.69	1.23				
				1214	3.99*	.000	S
Female	580	13.97	1.21				
			Head Circumference Measurements				
Male	636	48.32	3.83				
				1214	5.45*	.000	S
Female	580	49.34	2.49				

S Signifies p<0.05; and Significant

The results in Table 4 show the summary of the t-Test Analysis of the differences in weight, height, mid upper arm and head circumference measurements of preschool children aged 3-5 years based on gender of the study.

The table shows that all the dependent variables of the study depended significantly on the independent variables.

Conclusion

The study concluded that it is important that children not only acquire knowledge about adequate nutrition but also develop

good eating habits that would enhance their growth and development. It includes proper intake of food, liberation of energy, elimination of wastes and the biochemical syntheses that are essential for maintenance of normal growth and development. There is need for proper growth monitoring which consists of several assessments of both weight and height measurements in order to identify abnormal nutritional status and priority for treatment.

Recommendation

1. Since the goal of every health practitioner is to maintain a high level of nutritional health status for the population, the hospitality industry should always go for regular checkup using anthropometric indicators such as weight for height (W/H), weight for age (W/A) and height for age (H/A) to characterize the nutritional status of populations.

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