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THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND INTELLECTUAL ABILITY OF PRIMARY SCHOOL CHILDREN IN SOUTHERN CROSS RIVER STATE–NIGERIA

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ABSTRACT

The purpose of this study was to determine the relationship between the nutritional status and intellectual ability of primary six (6) pupils in Southern Cross River State-Nigeria. The *ex post facto* research design was used in carrying out the study. The sample size consisted of five hundred and seventy nine (579) public primary schools in Southern Cross River State using stratified random sampling technique. The instrument used for this study was an intelligence test consisting of 29 items divided into four sections A-D. Pearson's product moment correlation co-efficient was used in analyzing the result. The correlation coefficient value between them is 0.809. It is therefore recommended that primary school proprietors, administrators, even parents and government should put machinery in place to provide quality food to maintain good nutritional status of their pupils to enhance good intellectual abilities.
Key word: Nutritional Status, Intellectual status, primary school.

INTRODUCTION

The concept of intelligence may not be fully captured in a single definition. This is because intelligence is a psychological construct. Nobody has seen or touched intelligence. It is a scientific invention to help explain and predict aspects of human behaviour. Intelligence is an abstract phenomenon that can only be inferred from behaviour (Ukpong, 1999). According to Colman (2003), the word intelligence is derived from the Latin word *intelligere*' – meaning to understand. It is the faculty (natural ability) of reasoning and understanding as distinct from feeling and wishing.

The word 'ability' seems to be intimately related to such commonly used words as able and can. English and English (1998:4) define ability as 'actual power to perform an act, physical or mental whether or not, attained by training and education'. They further posited that general ability is concerned with all sorts of tasks but especially those of cognitive or intellectual sort. Denga (2002), defines ability as developed capacity as contrasted with potential capacity. Colman (2003), defines ability as developed skill, existing capacity to perform some function, whether physical, mental or both, without further education or training.

By using the phrase intellectual ability, Carroll (1993), limits the range of intellectual tasks to those that centrally involve mental functions not only in understanding of the intended end results but also in the performance of the task, most particularly in the processing of mental information.

Nutrition is defined by Umoh (2008), as the combination of processes by which the living organism receives and utilizes the materials (food) necessary for the maintenance of its functions such as growth and the renewal of its components. Foods on the other hand comprise all the solid and liquid materials taken into the digestive tract that are utilized to maintain and build body tissues, regulate body processes, and supply heat, thereby sustaining life. On their part, Ebong Uboh and Atangwo (2005) define nutrition as the science that deals with foods required by living organism, how the living organism utilizes the foods and how it deals with the waste products of its activities. In other words, nutrition is the study of the food an organism eats and the use of this food in the body. The purpose of nutrition is to maintain good health and prevent illness (Habtanu and Amassie, 2017) .

Foods may provide the organism with one or more of the six (6) nutrients required by the body (Umoh, 2008). Nutrients are the active principles or the ultimate nourishing chemical substances in food. Nutrients constitute the functional units/entities in food (Ebong *et al*, 2005). These nutrients include; carbohydrates, protein, fats (lipids), mineral elements and water. The human body requires these nutrients in correct proportions each day for proper functioning. If any situation arises that these nutrient requirements are not met, it results in bad or faulty nutrition or malnutrition (Umoh, 2008).

According to Umoh, Williams and Eyong (2010), nutrients can be assigned to three (3) functional categories:

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i. those that primarily provide energy e.g. carbohydrates, proteins and lipids (fats and Oils)
ii. those that promote growth , development and maintenance e.g. proteins, lipids, vitamins, mineral and water.
iii. those that keep body functions running smoothly (regulate body processes) e.g proteins , lipids, vitamins, mineral and water. Some overlaps exist among these groups. It is an indisputable fact that children exhibit variation in intellectual ability. Even within a given population, some children perform better than others intellectually. Also even identical twins vary in their level of intellectual abilities even when exposed to environmental conditions and experiences that are similar.

What perhaps are matters for dispute are the reasons put forward for these variations in intellectual ability. The reasons no matter how many and varied may be broadly categorized into either biological or environmental (nature or nurture). Indeed environmental factors determine the extent to which an individual attains his/her fullest innate intellectual ability (Gure, 1993). Rai (2001) and Denga (2002) attribute differences in intellectual abilities to inequalities in many factors, which include the nutritional status of children (quality of feeding).

Onyejiaku (1991), remarked that a number of studies have revealed that malnutrition during the first year of life has adverse effects on the later development of mental powers (abilities). The brain reaches 70% of its adult weight by the end of the first year of life and completes its growth by the second year of life (Onyejiaku, 1991). Ann *et al* (2020) noted that throughout the period of study, members of the undernourished group had smaller heads, lower weights and lower intelligence quotient (IQ) than the well fed children from he same socio-economic group.

Poorly nourished children have more problem fighting infections. Therefore they may be sick more often, miss more classes and fail to keep up with classmates (Troccoli, 1993). Under nutrition results in decreased activity levels, decreased curiosity and decreased cognitive function (Meyers and Cahwla, 2000). Many cross-sectional and longitudinal studies have demonstrated an association between early childhood malnutrition and later cognitive development (Grantham-McGregor, 2006).

RESEARCH QUESTION

The following research question was asked to guide the study.

1. Is there any relationship between the nutritional status of primary school pupils and their intellectual ability?

Hypothesis

The following hypothesis which guided the study which was tested at 0.01% levels of significance

1. There is no significant relationship between the nutrional status of primary school pupils and their intellectual ability.

RESEARCH METHODS

The *ex post facto* research design was chosen for this study because the demographic or independent variable in this study had already occurred or existed in primary six school pupils in southern Cross River State. The population of the study consisted of all the primary six (6) pupils in public primary schools in Southern educational Zone of Cross River State. The total number of 16491 pupils (8228 males and 8263 females) in 279 public primary schools across the seven (7) local government areas that make up the zone (State Universal Basic Education Board , 2012).

A sample of 506 pupils was used. The sampling procedure was done in stages involving disproportionate stratified random sampling techniques. The population of the study had definite subsets which thus lent itself to stratified random sampling technique. The first stage involved the grouping of the schools into seven (7) local government areas that make up the area of study. The second stage involved random selection of six (6) schools representing 15% of the number of schools in the area of study. The third stage involved random sampling of 12 pupils from each of the 42 sampled schools making a total 504 pupils. Two (2) additional pupils were from Odukpani because of it large population; thus giving a total of 506 pupils. All the schools sampled were mixed to ensure sex representation in the sample. Six (6) girls were sampled from each of the schools sampled for the study.

INSTRUMENTATION

The data for this research was obtained from one research instruments called an intelligence test made up of 14 items on the different food types that give the classes of nutrient required for balance diet. The questionnaire has levels of consumption ranging from zero to greater than nine.

The intelligence test divided into four sections from A-D with a total of twenty nine (29) items. Section A is made up of fourteen (14) items on the different food item that gives the classes of nutrient required for balance diet. This section has levels of pupils consumption rate per week ranging from zero to greater than nine. This section was designed by experts on human nutrition in the Departments of Biochemistry from University of Calabar and Cross river State University of Technology, Calabar. This section was designed to elcit information on the nutritional status of the pupils. Each item in this section is measured on a scale of 0-9. Section B –D is made up of 15 objective test items adapted from standardized intelligence tests by Binet and Simon (1916) in Anastasi and Urbina (2006). Section B was designed to test the perceptual intellectual ability of the respondents. That is, how the respondents can reason easily with symbols and shapes. This is made up of 5 objective items. Section C was designed to test the logical ability of the respondents. Logical reasoning is meant to test the validity of the conclusion reached from premises by respondents based on the application of the rules of inference. This section is equally made up of 5

objective items. Section D was designed to test the actuality intellectual ability of the respondents. Acuity intellectual ability is the ability to think, see quickly and clearly. This section is equally made up of 5 objective items.

The respondents were assured of confidentiality. The respondents were requested to tick the right choice in each of the items on the instrument. For section B-D the questionnaire items were objective in nature with 4 options lettered (A-D). The right option only was to be ticked on the question paper. The duration of the exercise was 30 minutes. The researcher's justification for using the instrument is because it is a standardized intelligence test. In addition, one of the instruments for measuring cognitive domain is intelligence test. This is a test of general mental or intellectual ability. It measures an individual's capacity to think abstractly, to integrate new experience and to adapt to new situations (Joshua, 2005).

Though the instrument was adapted from standardized intelligence tests, the content validity was ascertained by experts in measurement and evaluation from the University of Calabar.

To determine the reliability of the instrument, a pilot test was conducted using 60 primary six pupils randomly drawn from 2 primary schools in the area of study. A test-retest was administered on the 60 pupils sampled within an interval of two weeks. The reliability estimates ranged from 0.61 to 0.77. These values were considered sufficiently high to justify the use of the instrument for the study. The researchers personally visited the 42 schools sampled for the study. The instrument was administered by the researchers assisted by the class teachers. All the 506 copies of the instrument were retrieved representing 100% return rate. The data was analyzed using Pearson Product correlation coefficient statistic.

RESULTS/DISCUSSION

Table 1: Coefficient for nutritional status and intellectual ability of pupils

		Nutritional Status (NS)	Intellectual Ability (IA)
NS	Pearson Correlation	1	.809**
			.000
	Sig. (2-tailed)		
	N	506	506
IA	Pearson Correlation	.809**	1
	Sig. (2-tailed)	.000	
	N	506	506

**.Correlation is significant at the 0.01 level (2-tailed).

The data was analyzed using Pearson product Moment Correlation coefficient r for the relationship between nutritional status (NS) and intellectual ability (IA). The result (Table 1) revealed that there is a positive direct relationship between the two variables. The correlation coefficient value between them is 0.809. This means that about 80% relationship exists between nutritional status and intellectual ability of primary school pupils. The correlation value of 0.809 was also significant at the 0.01 levels of significance. The significance of the relationship means that the estimate of the relationship is not due to random but systematic error. This result is in agreement with other studies (Hamadani *et al*., 2004; Rai 2001; and Denga, 2002) who found that on enrolment, the adequately nourished group had a higher mental development index (P=0.06) than the malnourished children. It is recommended therefore that:

1. There should be increase intake of fish, periwinkle, snails and crayfish in the children's diet.
2. Cheap sources of nutrition like bush meat, insects, snakes, crabs and some unconventional, but available items be consumed to supplement nutrient intake.
3. More edible fruits be consumed as snacks to make up for the loss of vitamins incurred in the handling, processing and preparation of meals.
4. Nutrition education should be introduced at all levels of education to improve upon the existing levels of nutrition intake.

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