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Health Implication of Adequate Meal for Under 5 Children and Sustainable Human Resource Development in Orashi Region of Rivers State, Nigeria

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ABSTRACT

The study investigated the health implication of adequate meal for under 5 children and sustainable human resource development in Orashi region of Rivers State, Nigeria. The study adopted the descriptive survey design for a population of under 5 children and teachers/minders across private Nursery schools in the study area. Multistage stratified random sampling technique (in five phases) was used in the selection of 240 under 5 children, 72teachers/minders from 24 randomly selected Private Nursery schools and 72 Nutritionists from Ignatius Ajuru University of Education Port Harcourt. Three instruments via "Children Adequate Meal Checklist" (CAMC) administered to under 5 children aided by their teachers/minders, "Sustainable Human Resource Development Inventory" (SHRDI) administered to teachers/minders and "Nutritionists Adequate Meal Inventory" (NAMI) administered to Nutritionists were validated by 2 Home Economics experts, with the reliability coefficients of .571, .856 and .684 for the CAMC, SHRDI and NAMI instruments respectively were used. Datacollected was analyzed using frequency count, simple percentage, mean and standard deviation to answer research questions 1, 3, 4 and 6 and multiple linear regression analysis to answer research questions 2 and 5 at 0.05 level of significance. The study revealed that appropriate feeding pattern with food like: apples, cakes, eggs, milk, vegetables, bread and margarine, rice and tomato sauce, etc. filled with essential nutrients such as calcium, minerals, vitamins, protein, iron, water, fats and oil, and carbohydrates have traits that could lead to thesustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria. The study recommended amongst others that parents should provide their children with foods rich in calcium, minerals, vitamins, protein, iron, water, fats and oil, and carbohydrates rich foods that aid proper digestion, absorption and utilization, and commensurate growth, productivity and human development.

Introduction

Proper infant or children nutrition has an immediate impact on the children's health, wellbeing, normal growth and development during the child's transition to adulthood. Adequate meal has to do with the child's daily intake of the right proportion of micronutrients like calcium, iron, protein, vitamins, carbohydrate, minerals, fats and oil, and water to avoid becoming overweight (obesity), underweight (wasting) and susceptible to other nutritional diseases like dwarfism, rickets, kwashiorkor, etc. which could undermine the proper development of the intelligent quotient (IQ) as catalyst for the sustainable human resource development of the tomorrow of the today's child.

Amosu, Degun, Atulomah and Olanrewju (2011) sees nutritional status as measure of individual health condition dictated by the quality of nutrients consumed, and the body's ability to utilize them for its metabolic needs. Thus, being nutritionally vulnerable, under-5 children's nutritional status is generally accepted as an indicator of the nutritional status of any particular community or nation. This is due to their easy susceptibility to malnutrition and infection (Uppal, Kumari & Sidhu, 2005). Sustainable human resource development involves fulfilling our collective responsibilities to ensure a safer, cleaner, healthier, and more inclusive world for both today's children, and for their children (UNICEF, 2013). Therefore,investing in children's rights to health, nutrition, education and protection of the young and vulnerable children which leads to positive growth and social cohesion that can be inherited by generations to come, is at the centre of sustainable human resource development (UNICEF, 2013).

According to the World Health Organization (WHO, 2000), health is not only the absence of disease but a state of complete mental and physical wellbeing in relation to the productivity and performance of an individual. Therefore, good nutritional status can only be realized and sustained when children are provided a proper and balanced diet requisite for a healthy life for the under 5 children otherwise subjected to a pattern of ill health and poor development in early life and even infant mortality (UNICEF, 1998; Sobo & Oguntona, 2006).

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Today, roughly 165 million children aged under 5 are suffering from chronic nutritional deficiency during the first thousand days of a child's life (Guerrant, Oriá, Moore, Oriá & Lima, 2008). Globally, more than 3.5 million children under five years of age die unnecessarily each year due to the underlying cause of under-nutrition, and millions more are permanently disabled by the physical and mental effects of poor nutrition, the vast majority in south-central Asia and sub-Saharan Africa (Black, Allen, Bhutta, Caulfield, de Onis, Ezzati, Mathers & Rivera, 2008). Hence adequate meal for under 5 children could lead to activeness, bright eyes, straight legs, red lips, high intelligent quotient, positive response to environment and questions intelligently, not irritable, appropriate body mass index (BMI) etc.

Appropriate nutrition is a basic human need that remains unmet for a vast number of children especially in sub-Saharan Africa (Yunusa, Gumel, Adegbusi & Adegbusi, 2012). Furthermore, the health status of under 5 children (consisting of infant, toddler and pre-school children) is a sensitive indicator of overall community health. Children in this "transitional age groups" daily require several easily masticable and digestible meals and high supply of nutrient particularly that of protein for swiftly increasing muscle tissue (Amosu et al., 2011). Similarly, the under 5 children are in a fragile period of physical, mental and emotional development where they are particularly vulnerable to shocks and stress including violence and trauma, conflict, disasters, imposition, degradation and economic crisis (UNICEF, 2013). Also during this period, under-nutrition evident through kwashiorkor, dwarfish, wasting, marasmus, anemia and xerophthalmia are not uncommon (Ene-Obong, 2001).

Toddlers and preschoolers grow in spurts and their appetites come and go in spurts, so they may eat a whole lot one day and then hardly anything the next. Therefore, offering them a healthy selection of the required nutrition plays an important role in their physical and mental development. Essential nutrients needed by under 5 children include: Calcium rich foods like milk, cheese, soya milk, and calcium-fortified orange juices, cereals etc. are the body's building block and leads to the development of strong, healthy bones and teeth. Others are fruits, vegetables, whole grains, and beans, which all provide fiber. Not only does fiber prevent heart disease and other conditions, but it also helps aid digestion and prevents constipation (UNICEF and FGN, 2001).

Nutrition plays a critical role in the child's: articulation, self-confidence, activity and human resource development. Their deficiencies essentially lead to malnutrition as a public health problem attributed to poor socio economic condition in developing countries (Olusanya, 2010). That eventually, affects the child's mental and physical state, resulting in poor health, poor school performance and economic earnings later in life (Guerrant *et al.*, 2008). Furthermore, malnutrition arises from a complex of nutritional, social and biological deprivation and is manifested in various forms such as stunting (short stature), underweight, muscle wasting, growth retardation, diminished subcutaneous fat and ill health with high mortality rate (Onimawo, Amangbangwu & Eluwa, 2006). In addition, a malnourished child may have mild to serious learning disabilities, resulting in poor school performance; a sick, poorly nourished individual will not respond well to treatment, could lose many schooling hours and may continue to drain family and national resources.

Thus, malnutrition may undermine investments in education, health and other development sectors and services that promote equitable and sustainable progress (Yunusa *et al*., 2012).

Ogbimi and Ogunba (2011) study on the nutritional quality of the lunches of children in day care in Osun State of Nigeria, revealed an unfortunate situation, where the diets commonly offered to young children are of low quality and often lack variety, which is the key to specific nutrient adequacy. They are usually inappropriate, of low energy and nutrient density and as a result, multiple nutrient deficiencies are common in this age group. This violation to the child's inalienable rights to adequate nutrition healthy living, survival and growth, undoubtedly, hampers the implementation of international conventions, treaties, and other legal instruments with direct linkages to the Convention on the Rights of the Child (CRC), which that prescribes the protection and participation of the child in assessing and exploiting technology including other resources and services meant to sustain their progress socially, economically and educationally (UNICEF, 2013). Deductively, a well-nourished and healthy child today will likely be endowed with the requisite physical, mental and emotional attributes and resilience to surmount all forms of barriers, marginalization, violence and discrimination that may undermine the child's ability of contributing to the future wellbeing and development of the society.

Consequently, promoting and safeguarding children's emotional, social, physical and cognitive development. Including meeting their basic livelihood needs, enhancing wellbeing and equitable progress becomes the supportive platform or base for fostering the symbiotic relationship between children and sustainable human resource development. Experience has shown that children who have the education, skills and opportunities to participate and innovate become articulate, resourceful, effective advocates, organized, problem-solvers and agents for positive change. Inclusive and people-centred development means investing in the well-being and empowerment of children, so they can grow into responsible, coordinated, capable and skilled citizens, and effective guardians of a sustainable world (UNICEF, 2013). This is the crux of the matter which necessitates the study to the health implication of adequate meal or nutrition and sustainable human resource development of under 5 children in the Orashi region of Rivers state, Nigeria.

Problem specification

Nigeria is the most populous country in Africa, with a population of about 170 million, with about forty-four percent of the population predominantly made up of children (National Bureau of Statistics, 2010). Malnutrition prevalent among the under-5 children, is a potential threat to the health of these children, their families and the society in serious need of the conditions of the supposedly well-nourished children to the economic and technological development or transformation Nigeria.

The extent of poverty and nutritional illiteracy or ignorance of families could have resulted in the gross under-nutrition of the children. This alongside the fact that poor people in many societies lack the basic requirements necessary for adequate nutritional wellbeing therefore makes it imperative that efforts must be geared towards improving the nutritional status of under-5 children, in order to enhance their performance in the school and the society.

The risk factors for under-nutrition among children have been well described but data establishing differences in risk factors for under-nutrition for children across different regions, strata and class are few in Nigeria.It is based on the foregoing that this study investigated health implication of adequate meal for under 5 children and sustainable human resource development in Orashi Region of Rivers State, Nigeria. With a view at domesticating the local foodstuffs rich in the essential nutrients needed to promote the health and development of the child in the society.

Specifically, the purposes of this study were to:

1. Determine the type and nature of food or meal under 5 children daily consume in Nursery schools in Orashi region of Rivers State Nigeria.
2. Determine now appropriate feeding pattern enhance the sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria.
3. Determine the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria.
4. Identify nutritional diseases confronting under 5 children in in Orashi region of Rivers State, Nigeria.
5. Determine how nutritional diseases influence the intended sustainable human resource development of the under 5 children in Orashi region of Rivers State, Nigeria.
6. Identify the benefits of adequate nutrition to thesustainable human resource developmentofunder 5 children in Orashi region of Rivers State, Nigeria.

The following research questions guided this study:

1. What are the type and nature of food consumed by under 5 children in Nursery schools in Orashi region of Rivers State Nigeria?
2. How does appropriate feeding pattern enhance the sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria?
3. What are the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria?
4. What are the nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria?
5. How does nutritional diseases influence the intended sustainable human resource development of the under 5 children in Orashi region of Rivers State, Nigeria?
6. What are the benefits of adequate nutrition tothe sustainable human resource development ofunder 5 children in Orashi region of Rivers State, Nigeria?

Scope of the Study

The study was concentrated in the Orashi Region of Rivers State, Nigeria as a way of emphasizing the import of adequate meal and also intervening on lapses, nutritional ignorance and inappropriate nutrition of under 5 children attending Nursery schools in Orashi region, as the nucleus or beehive of Oil Exploration activities in Rivers State. The study is also delimited to the role of nutrients like iron, vitamins, minerals, fat, protein, calcium and water on the health and development of the under 5 child.

Significance of the Study

This study would be beneficial to the parents, children, teachers and schools, government and the society at large Parents will come to appreciate that the right intake of food or adequate dieting rather than teaching technique, accelerates the child health and mental wellbeing perquisite for building the child's intellectual capacity vis-à-vis academic success.

Children will be free from the clutches of malnutrition and its associated diseases that make them susceptible or vulnerable to lack of nutrients like vegetables, iron, vitamins, water, cereal grain, fruits, and legumes.

Teachers and schools will benefit from a healthy and mentally developed child, whose high intelligent quotient (IQ) will increase their self-confidence, articulation, association, activity, learning effectiveness and performance in the class.

The government and society will benefit as adequately nourished children will exhibit no trace of mental, physical, hereditary, and social imparity that tends to impede their resourcefulness in sustainably proffering solutions to the economic, social technological etc. development of the 21st Century.

Methodology

Research design

The study adopted the descriptive survey design for a cross section of under 5 children and teachers/minders across Private Nursery schools in all the four Local Governments Areas (via: Abua/Odual, Ahoada East, Ahoada West and Ogba/Egbema/Ndoni) of the Orashi region of Rivers State, Nigeria.

Study area

Orashi region otherwise the Old Ahoada block or axis of Rivers State comprises of fourLocal Government Areas (LGAs) namely:Abua/Odual, Ahoada East, Ahoada West and Ogba/Egbema/Ndoni. The major ethnic groups or tribes in this region include Abua, Ekpeye and Ogba with the Engennis as minority.The vegetation in Orashi region is the tropical rain forest. It has an annual rainfall of 180 centimeters and a mean temperature of 26°C. It has large arid or fertile land, which makes this region accounting for high level of farming activity in crops like oil palm products, cassava, yam, maize, cocoyam etc. and vegetables, melon, pineapples, mango, pepper, banana and plantain.

Furthermore, the Orashi region is famous for its vast reserves of crude oil and natural gas. It is perhaps the zone with the largest reservoir and production of oil and gas in Nigeria. More than 60% of the state's output of crude oil is produced in the region. These natural endowments accounted for the very diverse and fast-growing population, resulting from heavy and ongoing migration to this region including the high rate of oil exploration/prospecting ventures, farming, civil service, trading, lumbering and other economic activities.

Population

The population of the study consisted of all under 5 children, teachers and mindersin all the Private Nurseryschools in Orashi region of Rivers State, Nigeria. Similarly, the population will also be made up of 72 Nutritionist (made of lecturers and graduate students in the department of Home Economics, Ignatius Ajuru University of Education).

Sample and sampling technique

A sample of two hundred and forty (240) under 5 children, and seventy-two (72) teachers/minders in Private Nursery schools in Orashi region of Rivers State, Nigeria and seventy-two (72) Nutritionists from Ignatius Ajuru University of Education Port Harcourt was used for the study. Multistage stratified random sampling technique was used in the selection of the subjects in five phases. In the first phase, random sampling technique was used in the selection of Abua Central and Egbolom from the Abua LGA strata,

Okoboh and Edeoha from the Ahoada East LGA strata, Akinima and Okogbe from the Ahoada West LGA strata, Omoku and Obigwe from the Ogba/Egbema/Odoni LGA strata representing the urban and rural communities in the respective LGAs in Orashi region of Rivers State, Nigeria. In the second phase, purposive sampling technique was used in the selection of three (3) Private Nursery schools from each of the 8 strata in the ratio of 2:1 for the urban and rural communities respectively; this constituted a total of twenty-four (24) Private Nursery schools that was selected for the study.

In the third phase, purposive sampling was adopted in the selection of two (2) teachers and one (1) minder (totaling 3) in the ratio of 2:1 from each of the selected 24 Private Nursery schools. In the fourth, random sampling technique was used in the selection of ten (10) under 5 children (who will be represented by their teachers/minders) in the Pre-Nursery (less than two years) and Nursery (2-5 years) classes in each of selected 24 Private Nursery schools from the 8 strata classification of Orashi region. In the fifthand final phase, random sampling technique was used in the selection of 72 Nutritionists (via 12 lectures and 60 graduate students) in the department of Home Economics, Ignatius Ajuru University of Education Port Harcourt.This constituted a sample of 240 under 5 children, 72 teachers/minders (via 48 teachers and 24 minders) and 72 Nutritionists (via 12 lecturers and 60 graduate/penultimate students)used for the study.

Instrumentation

The instruments for data collection include"Children Adequate Meal Checklist" (CAMC), "Sustainable Human Resource Development Inventory" (SHRDI) and "Nutritionists Adequate Meal Inventory" (NAMI)made up of 20items, 25 itemsand 20 items respectively. The CAMC instrument administered to under 5 children waspatterned after a 4 point modified rating Likert scale of "Daily" (DA, 4 Points), "At-times" (AT, 3 Points), "Weekly" (WE, 2 Points), and "Never" (NE, 1 Point), the SHRDI instrument administered to teachers/minders was also patterned after a 4 point modified Likert rating scale of "Always" (AL, 4 Points), "At-times" (AT, 3 Points), "Somehow" (SO, 2 Points), and "Never" (NE, 1 Point) while the NAMI instrument administered to Nutritionist was patterned after a 4 point modified Likert rating scale of "Strongly Agree" (SA, 4Points), "Agree" (A, 3 Points), "Disagree" (D, 2 Points) and "Strongly Disagree" (SD, 1 Point). The CAMC, SHRDI and NAMI instruments were each validated by 2 Home Economics experts whose comments and observations were incorporated into the instruments.

The reliability of the instruments was established using the Cronbach Alpha method to establish the reliability or internal consistency of the non-cognitive instruments (CAMC, SHRDI and NAMI).

Therefore, forty (40) under 5 children, and 40 teacher and minders (20 each) selected from 10 Private Nursery schools in Obio/Akpor Local Government Area (not included among the sampled Private Nursery schools)was used for the study. Then 40 copies of the CAMC and SHRDI instruments was simultaneously administered to the pupils and teachers/minders respectively while 40 copies of the NAMI instrument was administered to 20 each Nutritionists. Upon completion the CAMC, SHRDIand NAMI instruments were retrieved, coded and analyzed using the Cronbach Alpha (r_a) method to obtain the reliability coefficients of .571, .856 and .684for the CAMC,SHRDI and NAMI instruments respectively.This result necessitated the use of the instruments for the study or data collection.

Ethical clearance

Ethical clearance was obtained prior to the commencement of the administration processfrom the management of all Nursery/Primary schools. In the same vein, permission was also obtained from the teachers/minders that were involved in the administration process.

Data collection

The research alongside two trained research assistants administered and also retrieved copies of the correspondingly numbered CAMC and SHRDI instruments administered to under 5 children and teachers/minders respectively in the Private Nursery schools using the self-structured questionnaire and anthropometric measurements. Similarly, copies of the NAMI instrument were administered to 72 Nutritionists from Ignatius Ajuru University of Education Port Harcourt using the self-structured questionnaire.At the end of the administration exercise, out of the 240 copies of the CAMC and 72 copies of the SHRDI instruments administered to the under 5 children and teachers/minders respectively, only 227 copies (representing 95% return rate) were valid copies of the CAMC and SHRDI instruments retrieved, while 137 out of the 144 (representing 95% return rate) copies of the NAMI instrument administered to Nutritionistswere valid copies retrieved.

Data analysis

The data collected was tabulated and subsequently analyzed using frequency count, simple percentage, mean and standard deviation to answer research questions 1, 3, 4 and 6 (with a criterion mean cut off of 2.5) while multiple linear regression analysis was used to answer research questions 2 and 5 at 0.05 level of significance.

Result

Research Question 1

What are the type and nature of food consumed by under 5 children in Nursery schools in Orashi region of Rivers State Nigeria?

Table 1a. Frequency, Percentage, Mean and Standard deviation on the type and nature of food consumed by under 5 children in Nursery schools in Orashi region of Rivers State Nigeria.

S/N	This child does the following:	Daily	At Times	Weekly	Never	Mean	SD	Nature of Food
1	Eats apple in school	202 (89.0%)	25 (11.0%)	- (0.0%)	- (0.0%)	3.89	.31	Appropriate
2	Bites candies in school	52 (22.9%)	148 (65.2%)	25 (11.0%)	2 (0.9%)	3.10	.61	Inappropriate
3	Takes water while in school	159 (70.0%)	64 (28.2%)	3 (1.3%)	1 (0.4%)	3.68	.52	Appropriate
4	Given chicken or fish as part of the meal	159 (70.0%)	62 (27.4%)	3 (1.3%)	3 (1.3%)	3.66	.56	Appropriate
5	Eats ripe fried plantain in school	77 (34.0%)	141 (62.1%)	6 (2.6%)	3 (1.3%)	3.29	.58	Inappropriate
6	Takes egg as part of his/her meal	141 (62.1%)	79 (34.8%)	2 (0.9%)	5 (2.2%)	3.57	.63	Appropriate
7	Drinks milk and rolls in school	97 (42.7%)	121 (53.4%)	8 (3.5%)	1 (0.4%)	3.38	.58	Appropriate

Table 1b. Frequency, Percentage, Mean and Standard deviation on the type and nature of food consumed by under 5 children in Nursery schools in Orashi region of Rivers State Nigeria.

S/N	This child does the following:	Daily	At Times	Weekly	Never	Mean	SD	Nature of Food
8	Takes chocolate drinks in school	75 (33.0%)	149 (65.7%)	2 (0.9%)	1 (0.4%)	3.31	.51	Appropriate
9	Eats chips and balls in school	50 (22.0%)	131 (57.7%)	26 (11.5%)	20 (8.8%)	2.93	.83	Inappropriate
10	Eats boiled yam and ketchups in school	72 (31.7%)	128 (56.4%)	24 (10.6%)	3 (1.3%)	3.19	.67	Inappropriate
11	Takes vegetables	89 (39.2%)	111 (48.9%)	23 (10.1%)	4 (1.8%)	3.26	.71	Appropriate
12	Takes noodles in school	98 (43.2%)	102(44.9%)	25 (11.0%)	2 (0.9%)	3.30	.70	Inappropriate
13	Takes soup and garri in school	112 (49.3%)	59 (26.0%)	29 (21.8%)	27 (11.9%)	3.13	1.04	Appropriate
14	Takes oranges in school	87 (38.4%)	84 (37.0%)	53 (23.3%)	3 (1.3%)	3.12	.81	Appropriate
15	Eats cake and doughnuts in school	70 (30.8%)	108 (47.6%)	30 (13.2%)	19 (8.4%)	3.01	.88	Appropriate
16	Feeds on bread and margarine	64 (28.2%)	112 (49.3%)	32 (14.1%)	19 (8.4%)	2.97	.88	Appropriate
17	Takes biscuits and juice in school	143 (63.0%)	75 (33.0%)	7 (3.1%)	2 (0.9%)	3.58	.60	Inappropriate
18	Takes milk and cereals in school	96 (42.3%)	73 (32.2%)	1 (0.4%)	57 (25.1%)	2.92	1.20	Appropriate
19	Eats popcorn and carbonated drinks in school	69 (30.4%)	133 (58.6%)	25 (11.0%)	- (0.0%)	3.19	.62	Inappropriate
20	Eats rice and tomato sauce	56 (24.7%)	86 (37.9%)	60 (26.4%)	25 (11.0%)	2.76	.95	Appropriate
	Grand Mean					2.82	0.89	

Tables 1a and b shows the frequency, percentage, mean and standard deviation of the type and nature of food consumed by under 5 children in Nursery schools in Orashi region of Rivers State Nigeria. The study revealed a grand mean score of 2.82 which suggest that under 5 children consumed all the types of food contained in items 1-20 in the school. It further shows that under 5 children in Orashi region consumed appropriate type of food as stated in: item 1 "Eats apple in school" ($\bar{X}$ =3.89), item 3 "Takes water while in school" ($\bar{X}$ =3.68), item 4 "Given chicken or fish as part of the meal" ($\bar{X}$ =3.66), item 6 "Takes egg as part of his/her meal" ($\bar{X}$ =3.57), item 7 "Drinks milk and rolls in school" ($\bar{X}$ =3.38), item 8 "Takes chocolate drinks in school" ($\bar{X}$ =3.31), item 11 "Takes vegetables (indigenous and continental)" ($\bar{X}$ =3.26), item 13 "Takes soup and garri in school" ($\bar{X}$ =3.13), item 14 "Takes oranges in school" ($\bar{X}$ =3.12), item 15 "Eats cake and doughnuts in school" ($\bar{X}$ =3.01), item 16 "Feeds on bread and margarine" ($\bar{X}$ =2.97), item 18 "Takes milk and cereals in school" ($\bar{X}$ =2.92) and item 20 "Eats rice and tomato sauce" ($\bar{X}$ =2.76).

Furthermore, Tables 1a and b shows that under 5 children also consumed inappropriate food like: bites candies in school (item2), eats ripe fried plantain in school (item 5), eats chips and balls in school (item 9), eats boiled yam and ketchups in school(item 10), takes noodles in school (item 12), takes biscuits and juice in school (item 17) and eats popcorn and carbonated drinks in school (item 20) which

could accentuate the issue of malnutrition in Orashi region of Rivers State, Nigeria.

Research question 2: How does appropriate feeding pattern enhance the sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria?

Table 2. Summary of Multiple Linear Regression Analysis how appropriate feeding pattern enhance the sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria.

Source	Sum of Squares (SS)	Df	Mean Square	F. Ratio	P-value	Remark
Regression	11088.647	1	11088.647	358.922	.000[b]	S
Residual	6951.221	225	30.894			
Total	18039.868	226				

Multiple R (rp) =.784a
R. Square (r2) = .615
Adjusted R2= .613
Standard Error of Estimate =5.55827
a.Dependent Variable: Sustainable Human Resource Development
b. Predictors: (Constant), Appropriate Nutrition of Under 5 Children

Table 2 shows that the use of appropriate feeding pattern to predict sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria yielded a coefficient of multiple regression R (rp) of 0.784 and multiple regression square (R^2) of 0.615 This also shows that F is 358.922 which is significant at $P < 0.05$ because the value of P is less than 0.05.

This shows that appropriate feeding pattern of under 5 children accounted for approximately 62 percent of the variance in sustainable human resource development in Orashi region of Rivers State Nigeria. In other words, 62% of the variance in the change in sustainable human resource development of under 5 children in Orashi region of Rivers

State Nigeria can be explained by pulling the different variables together. This means that 38% of the variation in sustainable human resource development of under 5 children cannot be explained by the variables of appropriate feeding pattern alone. Thus, there must be other variables.

Research Question 3: What are the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria?

Table 3 shows the frequency, percentage, mean and standard deviation of the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria. It further shows that the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria in ascending order include: item 1 "calcium" ($\bar{X}$ =3.34), item 6 "minerals" ($\bar{X}$ =3.18), item 4 "vitamins" ($\bar{X}$ =3.15), item 3 "protein" ($\bar{X}$ =3.13), item 2 "iron" ($\bar{X}$ =3.02), item 8 "water" ($\bar{X}$ =2.98), item 7 "fats and oil" ($\bar{X}$ =2.92), and item 5 "carbohydrates" ($\bar{X}$ =2.69). Furthermore, the grand mean score of 3.05 suggest that under 5 children highly or essentially need these nutrients for their sustainable human resource development in Orashi region of Rivers State Nigeria.

Research Question 4: What are the nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria?

Table 4 shows the frequency, percentage, mean and standard deviation of the nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria. It further shows that the nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria in ascending order include: item 13 "kwashiorkor (including looking sick and pale)" ($\bar{X}$ =3.27), item 10 "underweight or wasting" ($\bar{X}$ =3.18), item9 "overweight (obesity)" ($\bar{X}$ =3.17), and item 14 "low intelligent quotient" ($\bar{X}$ =2.89). Similarly, the respondents disagreed that item 11 "dwarfism or reduced height" ($\bar{X}$ =2.08) and item 12 "rickets or bow leg" ($\bar{X}$ =2.02) are possible nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria. Furthermore, the grand mean score of 2.75 could suggest the conservative nature of therespondents and the likelihood that under 5 children in Orashi region of Rivers State Nigeria are confronted with these nutritional diseases which may undermine the realization of sustained human resource development in Orashi region of Rivers State Nigeria.

Research question 5

How does nutritional diseases influence the sustainable human resource development of the under 5 children in Orashi region of Rivers State, Nigeria?

Table 5. Summary of Multiple Linear Regression Analysis on the influence of nutritional diseases on sustainable human resource development of the under 5 children in Orashi region of Rivers State, Nigeria.

Source	Sum of Squares (SS)	Df	Mean Square	F. Ratio	P-value	Remark
Regression	43.449	1	43.449	.511	.476[b]	NS
Residual	11489.631	135	85.108			
Total	11533.080	236				

Multiple R (rp) =.061a
R. Square (r2) = .004
Adjusted R2= -.004
Standard Error of Estimate =9.22542
a. Dependent Variable: Sustainable Human Resource Development
b. Predictors: (Constant), Possible Nutritional Diseases Confronting Under 5 Children

Table 3. Frequency, Percentage, Mean and Standard deviation on the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria.

S/N	Under 5 children need the following nutrients:	Strongly Agree	Agree	Disagree	Strongly Agree	Mean	SD	Decision	Rank
1	Calcium	50 (36.5%)	85 (62.0%)	1 (0.7%)	1 (0.7%)	3.34	.54	*	1st
2	Iron	25 (18.2%)	93 (67.9%)	16 (11.7%)	3 (2.2%)	3.02	.62	*	5th
3	Protein	44 (32.2%)	71 (51.8%)	18 (13.1%)	4 (2.9%)	3.13	.75	*	4th
4	Vitamins	43 (31.5%)	75 (54.7%)	15 (10.9%)	4 (2.9%)	3.15	.72	*	3rd
5	Carbohydrates	26 (19.0%)	61 (44.5%)	31 (22.6%)	19 (13.9%)	2.69	.94	*	8th
6	Minerals	54 (39.4%)	65 (47.4%)	6 (4.4%)	12 (8.8%)	3.18	.87	*	2nd
7	Fats and oil	37 (27.0%)	67 (48.9%)	20 (14.6%)	13 (9.5%)	2.93	.89	*	7th
8	Water	21 (15.3%)	94 (68.6%)	20 (14.6%)	2 (1.5%)	2.98	.60	*	6th
	Grand Mean					3.05	0.74	*	

* =Agree while # =Disagree.

Table 4.Frequency, Percentage, Mean and Standard deviation on the nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria.

S/N	Possible nutritional diseases confronting under 5 children include:	Strongly Agree	Agree	Disagree	Strongly Agree	Mean	SD	Decision	Rank
9	Overweight (obesity)	45 (32.8%)	72 (52.6%)	18(13.1%)	2(1.5%)	3.17	.70	*	3rd
10	Underweight or wasting	44 (32.1%)	75 (54.7%)	16 (11.7%)	2(1.5%)	3.18	.69	*	2nd
11	Dwarfism or reduced height	17 (12.4%)	24 (17.5%)	49 (35.8%)	47(34.3%)	2.08	1.01	#	5th
12	Rickets or bow leg	15 (10.9%)	20 (14.6%)	54 (39.4%)	48(35.0%)	2.02	.97	#	6th
13	Kwashiorkor(including looking sick and pale)	63 (46.0%)	57 (41.6%)	5 (3.6%)	12(8.8%)	3.27	.92	*	1st
14	Low Intelligent Quotient	33 (24.1%)	60 (43.8%)	27 (19.7%)	17(12.4%)	2.80	.95	*	4th
	Grand Mean					2.75	0.87	*	

* =Agree while # =Disagree.

Table 5 shows that the influence of nutritional diseases on sustainable human resource development of the under 5 children in Orashi region of Rivers State, Nigeria yielded a coefficient of multiple regression R (rp) of 0.061and multiple regression square (R^2) of 0.004 This also shows that F is 0.511 which is not significant at P> 0.05 because the value of P is greater than 0.05. The result could suggest that nutritional diseases did not significantly influence under 5 children sustainable human resource development. In other words, nutritional diseases affected the sustainable human resource development of under 5 childrenin Orashi region of Rivers State Nigeria.

This shows that nutritional diseases accounted for 0.4 percent of the variance in under 5 children sustainable human resource development in Orashi region of Rivers State Nigeria. In other words, 0.4% of the variance in the change in sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria can be explained by pulling the different variables together. This means that 99.6% of the variation in sustainable human resource development of under 5 children cannot be explained by the variables of nutritional diseases alone. Thus, there must be other variables.

Research Question 6

What are the benefits of adequate nutrition to the sustainable human resource development ofunder 5 children in Orashi region of Rivers State, Nigeria?

Table 6 shows the frequency, percentage, mean and standard deviation of benefits of adequate nutrition to the sustainable human resource development of under 5 children in Orashi region of Rivers State, Nigeria. It further shows that the benefits of adequate nutrition to the sustainable human resource development of under 5 children in Orashi region of Rivers State, Nigeria in ascending order include: item 20 “not irritable and properly coordinated” ($\bar{X}$ =3.27), item 19 “appropriate body weight and normal height” ($\bar{X}$ =3.21), item 16 “bright eyes and red lips” ($\bar{X}$ =3.02), item 18 “high intelligent Quotient and quick response to questions and changes” ($\bar{X}$ =2.92), item 15 “activeness in the class” ($\bar{X}$ =2.91) and item 17 “straight legs” ($\bar{X}$ =2.81).Furthermore, the grand mean score of 3.02 suggest that adequate nutrition could be highly beneficialto the sustainable human resource development of the under 5 childrenin Orashi region of Rivers State Nigeria.

Discussion

The result in Tables 1a and brevealed that under 5 children in Nursery schools in Orashi region of Rivers State Nigeria consumed appropriate foods like: eats apple in school,takes water while in school,takes chicken or fish as part of meal,takes egg as part of his/her meal,drinks milk and rolls in school, takes chocolate drinks in school, takes vegetables (indigenous and continental),takes soup and garri in school, takes oranges in school, eats cake and doughnuts in school, feeds on bread and margarine, takes milk and cereals in school, and eats rice and tomato sauce. This finding is consistent with previous submissions by FAO (2002) which emphasized that the provision of food or meal with the sufficient and right ration of calories, proteins and other specific nutrients, enhances the articulation, well-functioning and protection of the right to be fed and survival of especially the vulnerable population (children and the elderly).Furthermore, this"right to adequate food" is a much higher standard, realized when every man, woman and child individually or collectively have the physical and economic access at all times to procure safe, well prepared, variety of nutritive and dignifying food with essential elements needed to enable an active and healthy life (Golay & Özden, 2006).

Furthermore, Tables 1a and b also revealed that under 5 children also consumed inappropriate food in school like: bites candies, eats ripe fried plantain, eats chips and balls, eats boiled yam and ketchups, takes noodles, takes biscuits and juice and eats popcorn and carbonated drinks which could accentuate the issue of malnutrition in Orashi region of Rivers State, Nigeria. This finding is consistent with Ogbimi and Ogunba (2011) emphasized that inappropriate mealswith low: energy, quality, nutrient density and variety of specific nutrient deficiencies offered to young children violates the child’s inalienable rights to adequate nutrition healthy living, survival and growth,mental development, articulation, performance and resourcefulnessthat may undermine the child’s ability of contributing to the future wellbeing and development of the society.

The result in Table 2revealed that appropriate feeding pattern statistically (approximately 62 percent) and significantly (P < 0.05 or less than 0.05) contributed to the sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria. This finding is in agreement with earlier findings by Bordi, *et al*. (2002) that appropriate feeding pattern among children play a key role in their mental and physical development, promotion of growth and reduced risks of associated diseases. Including the high performance of the articulated child, whose ability to effectively assess and exploit resources and services thatpromotes and safeguards their wellbeing, equitable progress and transformation, emotional, social, physical and

Table 6. Frequency, Percentage, Mean and Standard deviation on the benefits of adequate nutrition to the sustainable human resource development ofunder 5 children in Orashi region of Rivers State, Nigeria.

S/N	Benefits of adequate nutrition for under 5 children include:	Strongly Agree	Agree	Disagree	Strongly Agree	Mean	SD	Decisio	Rank
15	Activeness in the class	39 (28.5%)	56 (40.9%)	33 (24.1%)	9 (6.6%)	2.91	.89	*	5th
16	Bright eyes and red lips	39 (28.5%)	69 (50.4%)	22 (16.1%)	7 (5.1%)	3.02	.81	*	3rd
17	Straight legs	34 (24.8%)	56 (40.9%)	34 (24.8%)	13 (9.5%)	2.81	.92	#	6th
18	High intelligent Quotient and quick response to questions and changes	35 (25.5%)	64 (46.7%)	31 (22.6%)	7 (5.1%)	2.92	.83	#	4th
19	Appropriate body weight and normal height	48 (35.0%)	71 (61.8%)	17 (12.4%)	1 (0.7%)	3.21	.68	*	2nd
20	Not irritable and properly coordinated	61 (44.5%)	56 (40.9%)	8 (5.8%)	12 (8.8%)	3.27	.92	*	1st
	Grand Mean					3.02	0.84	*	

* =Agree while # =Disagree.

cognitive development, and sustainability in meeting children's basic livelihood needs (UNICEF, 2013).

The result in Table 3 revealed a relatively high grand mean score of 3.05 which suggest that the nutrients highly needed for the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria in ascending order include: calcium, minerals, vitamins, protein, iron, water, fats and oil, and carbohydrates. This finding is consistent with the views of UNICEF and FGN (2001) that essential nutrients needed by under 5 children include: calcium, fruits, vegetables, whole grains, and beans, which all provide fiber. Not only does fiber prevent heart disease and other conditions, but it also helps aid digestion and prevents constipation.

The result in Table 4 revealed that the nutritional diseases confronting under 5 children in Orashi region of Rivers State, Nigeria in ascending order include: kwashiorkor (including looking sick and pale), underweight or wasting, overweight (obesity), and low intelligent quotient. These nutritional diseases alongside dwarfism or reduced heightand rickets or bow leg(disagreed by the respondents) could be due to the inappropriate meals (in Tables 1a and b) consumed by under 5 children in Orashi region of Rivers State, Nigeria. Furthermore, the grand mean score of 2.75 could imply the likelihood that under 5 children in Orashi region of Rivers State Nigeria are confronted with these nutritional diseases due to inappropriate meal. This finding is supported by Onimawo*et al.*(2006) who posited that stunting (short stature), underweight, muscle wasting, growth retardation, diminished subcutaneous fat and ill health, overweight, kwashiorkor etc. are diseasesconditions caused by malnutrition predisposing and low intelligent quotientand high mortality rate.

The result in Table 5suggests that nutritional diseases did not significantly influence under 5 children sustainable human resource development. In other words, nutritional diseases affected the sustainable human resource development of under 5 childrenin Orashi region of Rivers State Nigeria. This finding aligns with UNICEF and FGN (2001) which emphasized thatthe inadequate or excessive intake of nutritious meals may result from disease factors that affect digestion, absorption, transport, and utilization of nutrients culminating into malnutrition as a pathological condition brought about by the inadequacy or over consumption of one or more of the essential nutrients necessary for survival, growth, reproduction, human development as well as productivity at work.

The result in Table 6 revealed a relatively high grand mean score of 3.02 which suggest that benefits of adequate nutrition to thesustainable human resource developmentof under 5 children in Orashi region of Rivers State, Nigeria include: not irritable and properly coordinated, appropriate body weight and normal height, bright eyes and red lips, high intelligent Quotient and quick response to questions and changes, activeness in the class, and straight legs. This finding is in agreement with Olusanya (2010) that nutrition plays a critical role in the child's: articulation, self-confidence, health, high school performance, agility, activity and human resource development. This is a reward for investments in education, health and other development sectors and services that promote equitable and sustainable progress (Yunusa *et al*., 2012).

Conclusion

The study concludes that under 5 children in Nursery schools in Orashi region of Rivers State Nigeria consumed appropriate foods like: apple, egg, chicken or fish, in school, vegetables, oranges, cakes and doughnuts, bread and margarine, rolls, milk and cereals, rice with tomato sauce, soup and garri and water as part of meal in the school. These foods contains essential nutrients like calcium, minerals, vitamins, protein, iron, water, fats and oil, and carbohydrates which enabled the under 5 children to have: appropriate body weight and normal height, bright eyes and red lips, high intelligent quotient and straight legs contributed to the sustainable human resource development of the under 5 children in Orashi region of Rivers State Nigeria.

Furthermore, inappropriate foods or meals like bites candies, eats ripe fried plantain, eats chips and balls, eats boiled yam and ketchups, takes noodles, takes biscuits and juice and eats popcorn and carbonated drinks consumed by under 5 children accentuated the issue of nutritional diseases like: kwashiorkor (including looking sick and pale), underweight or wasting, overweight (obesity), and low intelligent quotient which affected the sustainable human resource development of under 5 children in Orashi region of Rivers State Nigeria.

Recommendations

Based on the findings of the study the following recommendations were proffered:

1. Parents are encouraged to provide their children with foods rich in calcium, minerals, vitamins, protein, iron, water, fats and oil, and carbohydrates rich foods that aid proper digestion, absorption and utilization, and growth, productivity and human development.
2. Children should be regularly fed with apples, cakes, fish, children, egg, water, milk, rolls, chocolate, bread and margarine, oranges, vegetables and cereals which enhances their nutrient adequacy and immunity against diseases.
3. Parents are encouraged to feed their children with appropriate feeding pattern that will enhance the sustainable human resource development of the under 5 children.
4. Meals with essential nutrients such as calcium, minerals, vitamins, protein, iron, water, fats and oil, and carbohydrates are highly recommended for sustainable human resource development of under 5 children.
5. Children should not be given inappropriate or nutrient deficiency meals that could accentuate the issue of nutritional diseases like kwashiorkor, underweight or wasting, and overweight (obesity) that affects the intelligence, resourcefulness and development of children.
6. Children should be properly and adequately fed to avoid the occurrence of nutritional diseases that will affect the sustainable human resource development of under 5 children.
7. Children should be given protein and carbohydrate rich foods for appropriate body weight and normal height of children.,
8. Parents are advised to give calcium rich foods that build children's bones andstraight legs, and vitamins that builds immunity against diseases

Iron rich foods should be given to children in view of its ability to enhance high intelligent quotient and activeness of children both at home or in the class.

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APPENDIX

Children Adequate Meal Checklist (CAMC)

Instruction: Please tick (√) as applicable

SECTION A: DEMOGRAPHIC VARIABLES

SECTION B: Item Response

S/N	This child does the following:	Daily	At times	Weekly	Never
1	Eats apple in school				
2	Bites candies in school				
3	Takes water while in school				
4	Given chicken or fish as part of the meal				
5	Eats ripe fried plantain in school				
6	Takes egg as part of his/her meal				
7	Drinks milk and rolls in school				
8	Takes chocolate drinks in school				
9	Eats chips and balls in school				
10	Eats boiled yam and ketchups in school				
11	Takes vegetables (indigenous and continental)				
12	Takes noodles in school				
13	Takes soup and garri in school				
14	Takes oranges in school				
15	Eats cake and doughnuts in school				
16	Feeds on bread and margarine				
17	Takes biscuits and juice in school				
18	Takes milk and cereals in school				
19	Eats popcorn and carbonated drinks in school				
20	Eats rice and tomato sauce				

1. **Gender of Child:** Male ( ) Female ( )
2. **Age of Child:**Less than 2 years ( ) 2-3 years ( ) 4-5 years ( )
3. **Class of Child:** Pre-Nursery ( ) Nursery ( )
4. **Nature of child's residence:** Residing with mother ( ) Residing with caregiver ( )

Sustainable Human Resource Development Inventory (SHRDI)

S/N	This child puts up the following positive acts in school:	Always	At times	Somehow	Never
1	Very articulate				
2	Responds to instruction				
3	Highly Self-confident				
5	Learns effectively and very excited in the class				
6	Engages in class activities				
7	Freely ask and answers questions in the class				
8	Easily solves puzzles				
9	Quickly finishes class work				
10	Associates freely with other children				
11	Operates the computer				
12	Freely makes request and expresses opinion in the class				
13	Enjoys being given responsibilities to lead				
14	Exhibits traces of skills or talent like drawing, handcraft etc. in class				
15	Attempts to speak in behalf of other children				
16	Have different ways of carrying out task/work				
17	Quickly adapts to several changes in the class/environment				
S/N	This child puts up the following negative acts in school:	Always	At times	Somehow	Never
18	Looks sick and weak whenever at school				
19	Cries whenever his/her parents drops him/her off at school				
20	Highly Irritable and always complaining				
21	Uncoordinated and easily loosing belongings				
22	Engages in activities that distracts other children in the class				
23	Becomes shy when opinions and request are not granted				
24	Intimidated by physical appearance like height etc.				
25	Difficulty in solvingtasks and puzzles				

NutritionistsAdequate Meal Inventory (NAMI)

Instruction: Please tick (√) as applicable "SA= Strongly Agree", "A= Agree", "D=Disagree", and "SD= Strongly Disagree".

SECTION A: DEMOGRAPHIC VARIABLES

1. Gender of teacher/minder: Male ( ) Female ( )
2. Age of teacher/minder:Less than 20 years ( ) 21-30 years ( ) 31 years and Above ( )
3. Category of respondent: Minder ( ) Teacher ( )
4. Qualification: SSCE/GCE ( ) NCE ( ) Bachelor Degree ( ) Master Degree ( )

SECTION B: Item Response

S/N	Under 5 children need the following nutrients:	SA	A	D	SD
1	Calcium				
2	Iron				
3	Protein				
4	Vitamins				
5	Carbohydrates				
6	Minerals				
7	Fats and oil				
8	Water				
	Possible nutritional diseases confronting under 5 children include:				
9	Overweight (obesity)				
10	Underweight or wasting				
11	Dwarfism or reduced height				
12	Rickets or bow leg				
13	Kwashiorkor(including looking sick and pale)				
14	Low intelligent Quotient				
	Benefits of adequate nutrition for the under 5 children include:				
15	Activeness in the class				
16	Bright eyes and red lips				
17	Straight legs				
18	High intelligent Quotient and quick response to questions and changes				
19	Appropriate body weight and normal height				
20	Not irritable and properly coordinated				