Determining the Factors that Affect Dietary Intake of Primary School Pupil and their Nutritional Status in Bauchi, Nigeria

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Abstract

Incidence of malnutrition is common among school children. There is strong indication that unpleasant wellbeing and malnutrition badly affect education. The objective of the study was to determine the factors affecting dietary intake of primary school pupil in Bauchi State. A descriptive survey with cross sectional design study was used on a sample of 120 mixed primary school pupils. Quantitative data was analyzed by descriptive statistical while Pearson product moment correlation coefficient® was used to show the relationship between non- definite variables. The result indicated that 70% of the primary school pupils have normal weight while 19% are under weight, 6% over weight and 5% of the total sample are Obese due to their dietary intake. Dietary effect on nutritional status of Pupils (r=-0.114, p= 0.003). Sanitation effect on BMI (r=0. 166, p=0.053) Pupils' Gender effect on BMI (r= -.061, p=0.629) Mothers' occupation effect on BMI (r=.043, p=0.383) Fathers' Occupation effect on BMI (r=-.064, p=0.090) House hold size effect on BMI of Pupils (r=-.045, p=0. 358) Age of Pupils effect on BMI (r=.019, p=0.650). The study concluded that dietary intake had a negative but significant effect on nutritional status of Pupils. It is therefore recommended that war against malnutrition in the country by sustainable development goal and program be encouraged and supported by public enlightenment campaign.

Keywords: *Dietary intake, Nutrition, Mal-Nutrition, Primary school pupil, Body Mass Index (BMI)*

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Background to the Study

Children carry the burden of under-nutrition and are at the highest risk of infirmity and death related with it malnutrition. Children who are malnourished are more vulnerable to diseases, even nurturing children later in life is too little, too costly and too late to improve nutrition or impending productivity (Bamidele, Oyenike, & Olusegun , 2016). Roughly 60% of children who die from common illnesses like malaria and diarrhea would not have died if they were not malnourished in the first place (WHO, Children: reducing mortality. Fact sheet, 2016).Worldwide, more than 80% of deaths associated with childhood under-nutrition involve mild or moderate under-nutrition, though immediate source of death may be other circumstances (Weisstaub, Aguilar , & Uauy , 2014). Families existing under situations of lack and deficiency are always at danger of becoming malnourished. Malnutrition is viewed as a disease upsetting millions of people in the world. Exposed people, such as children, women (particularly pregnant mothers), the elderly and people suffering with a ill health extremely suffer the effects of malnutrition. In addition, malnutrition exacerbates the cycle of poverty inherent in most under-developed countries. Many scholars recognize the relationship between malnutrition and poverty, the World Bank pointed that, "Decreasing malnutrition is essential to decreasing poverty"(Frye, 2013).

Malnutrition is one of the contributing factors to reduced mental and physical development of children, hence delayed enrolment, poor physical performance, increased school absenteeism, increased dropouts, and low academic and professional achievements. The school-age period is nutritionally significant because it is the prime time to build up body stores of nutrients in preparation for rapid growth during adolescence (Sati & Dahiya, 2012).Primary school age is a period of physical growth, mental development and social adaptation of a child. This age group (5–12 years old) is potentially vulnerable and susceptible to growth and general developmental challenges. Often, the adverse effects of poor nutrition at this age are not reversible and eating habits have not been established (Mesfin, Berhane , & Worku , 2015).

Problem that led to this study is that, the report by WHO shows that in 2011 over 101 million children were underweight (low weight for age), 165 million were stunted (low height for age), and approximately 52 million were wasted (low weight for height) (WHO, 2012). The incidences of malnutrition among school-aged children advocate that these factors do not improve much with age (Acham, Kikafunda, Malde, & Oldewage-Theron, 2012). Researching on the factors that can improve the nutritional well-being of school-age children has the prospect of reducing the harshness of stunting, increase weight, and support intellectual function and possibly prevents any serious effect (Frye, 2013). A shocking 41% of all children under five in Nigeria are persistently undernourished, 23% are underweight, and 14% suffer from severe malnutrition. In the northern region the statistics are even more alarming with more than half of all children stunted (Safe the Children, 20114).

Malnourishment

Nutritional status on person is basically hinge on the relationship between food that is eaten, the general state of health and the physical environment (WHO, 2016). Malnutrition is both a medical and social disorder, often rooted in poverty. Combined with poverty, malnutrition contributes to a downward spiral that is fuelled by an increased burden of diseases, stunted development and reduced ability to work. Poor water and sanitation are important determinants in this connection, but sometimes improvements do not benefit the entire population. For example, only the wealthy can afford better drinking water supplies or irrigation. Nutrition status is compromised where people are exposed to high levels of infection due to unsafe and insufficient water supply and inadequate sanitation (WHO, 2012). Secondly, malnourished pupils suffering from frequent diarrhoea will not benefit fully from food because of inadequate absorption of nutrients. Moreover those who already are experiencing protein energy malnutrition are more susceptible to, and less able to recover from, infectious diseases (WHO, 2000). Looking at the dietary intake along the series of National Nutrition Council (NNC), the decrease in energy and micronutrient intake is due to the decrease in food consumption because the trend in dietary intake generally follows the trend in nutrient intake (Florentino et al., 1999). Lack of knowledge is one of several factors that cause malnutrition. Hence, parents and other members of the community and children require sound knowledge of malnutrition condition in order for them to take preventative measures. For instance, mothers' knowledge is crucial for raising children's health (Variyam et al., 1999). The physical environment of the school in particular is an essential factor in children learning (Long - Shan et al., 2000). Failure of availability of good sanitary facilities and safe water supply leads to illness, hence malnutrition.

According to Unicef, (1998) conceptual framework malnutrition is the outcome of interrelated complex basic, underlying and immediate causes. Malnutrition and death are the result of interlinked causes at the different levels and depths. To alleviate malnutrition, the causal factors at the different depths of analysis must be addressed. As per the conceptual framework 1998, immediate causes of malnutrition are associated with dietary intake, stress, trauma and diseases. Immediate causes are influenced by the underlying causes of malnutrition, which are linked to the level of household food security, maternal and childcare, education and information, as well as health services and environment. In turn, the underlying causes are influenced by the basic causes of malnutrition like the availability and control of resources as well as the political, social, ideological, economic and cultural factors that affect the availability and control of resources (Unicef, 1999).

The main aim of the study is to determine the factors affecting dietary intake of primary school pupil in Bauchi. The study has the following objectives;
1. To determine how Dietary Practice affect the Body Mass Index (BMI) of primary school pupil in Bauchi
2. To evaluate the influence of Father and Mothers' occupation on the BMI of primary school pupil in Bauchi

3. To find out if Pupils' Gender and Age affect the BMI of primary school pupil in Bauchi
4. To determine the influence of House hold size on the BMI of primary school pupil in Bauchi
5. To evaluate the impact of Sanitation on the BMI of primary school pupil in Bauchi

Study Hypotheses

Ho₁. There is no association between Dietary Practice and BMI of primary school pupil in Bauchi

Ho₂. There is no association between Father and Mothers' occupation and BMI of primary school pupil in Bauchi

Ho₃. There is no association between Pupils' Gender and Age and BMI of primary school pupil in Bauchi

Ho₄. There is no association between House hold sizes and BMI of primary school pupil in Bauchi

Ho₅ There is no association between Sanitation and BMI of primary school pupil in Bauchi

Factors at the community and environment level can influence a child's eating behavior due to the availability of foods offered during school hours (Bevans, Sanchez , Teneralli , & Forrest , 2011). Children spend a momentous time each weekday in the school environment; therefore, the school setting has the potential to be a practical effect and interventions aimed at malnutrition (Murimi, Matthew , Heather , McCollum, & Mcdonald, 2016). Combined, school meals and snacks can provide up to 50% of a student's daily caloric intake (Larson & Story , 2009).

Regardless of the importance of the environmental factor and parents' socio economic factor, the most significant influence on children's eating patterns may be individual-level factors, especially in adolescents (Fitzgerald, Heary , Nixon , & Kelly , 2010).

Methodology
The main purpose of this study is to determine the factors affecting dietary intake of primary school pupils. A mix method was employed in this research – the quantitative and the qualitative method. Consequently, the epistemological and the ontological assumption of this study take the positivist and the constructivist view of philosophical position respectively. The positivist studies human behavior using the quantitative approach (Crossan, 2003; Ruben and Babbie, 2013; Evangelista et al, 2012). This method was chosen because it ensures link between theory and research and uses questionnaire which is a measurable instrument; being more statistical in nature to collect data on Pupils' social economic and demographic factors, anthropometrical measurement, feeding and nutritional status Secondly it assumes the constructivist view of ontological assumption which engages the object of the study in a subjective way using the qualitative approach of research. This research uses the observation list as its qualitative method of data collection. In other to establish the link between theories and research this

study uses both primary and secondary data. The primary data are the first hand information gathered from the pupils concerning their dietary intake, family socio-economic status, feeding pattern, height, weight and body mass index. While the secondary data are the existing literature related to the subject matter; they set the background for every study and provide quick information on the problem being studied (Veal, 2011). This study was carried out in Bauchi metropolis. A total number of one hundred and twenty (120) pupils within the age 8-12 years were selected using purposive simple random sampling method from six (6) schools made up of three (3) public and three (3) private primary mixed day schools; in each school, twenty pupils were sampled. It was necessary to use this method since it is cumbersome to determine the total number of pupils in Bauchi State due to poor record keeping. Oloyede and Ogunsola (2009) decried the impracticality of determining the total number of people, events or variables that exist in organizations, institutions and establishments in Nigeria due to poor record keeping by various ministries. Unfortunately, schools are one of such institutions. Therefore the purposive sampling which is a non-probability sampling method was the most suitable; it allows the selection of available sample within reach. The questionnaire was developed in line with the objectives; and the pupils were assisted in completing the questionnaires as they supply the needed answers. An observation list was developed for 24-hour dietary recall and food frequency. Observation was also carried out around school setting to check how schools handle issues like safe drinking water, lunch break and school meals.

Quantitative data was analyzed using Pearson product moment correlation coefficient(r) to show the relationship between non- definite variables. The observation result was analyzed using thematic analysis; it involves organizing the information according to questions; and categorizing it into patterns and themes while issues observed were replicated in written report (Mugenda and Mugenda, 2003).

Pretest of research instrument is necessary to check the reliability and the validity of the instrument; which should give similar results if the same study is replicated; secondly, to ensure the questions asked are not ambiguous but simple and easy to understand (Veal, 2011). Therefore the research instrument was pretest using twenty pupils.
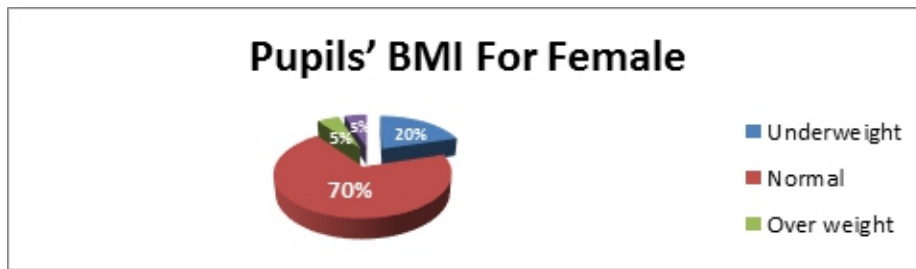
Results
The result in Figure 1 shows that 70% of the primary school pupils have normal weight while 19% are under weight, 6% over weight and 5% of the total sample are Obese due to their dietary intake or due to some other factors that are responsible for such.
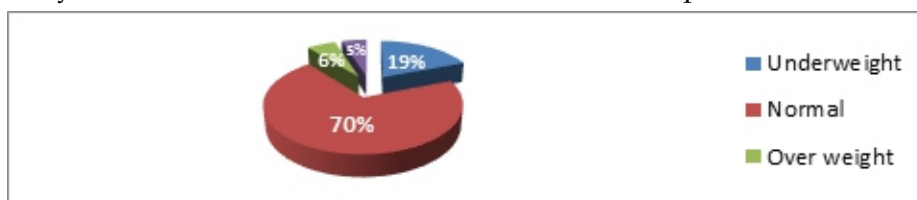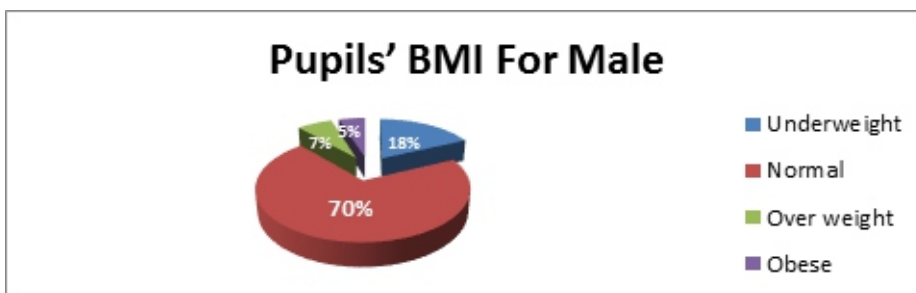

Figure 1: School Pupils' Nutritional Status
Source: Field Work, (2016)

Figure 2: Pupils' BMI for Female
Source: Field Work, (2016)

The BMI for the female pupils indicated that; 70% of the female have normal weight but 20% of them are underweight while, 5% are overweight and also 5% are obese.

Figure 3: Pupils' BMI for Male
Source: Field Work, (2016)

The result for male BMI illustrations that; 70% of the total samples have normal weight, but 18% of the boys are underweight while, 7% of them are overweight and 5% of them are obese.

Correlation Analysis
The correlation analysis on Table 1 indicated that sanitation and Pupils' BMI were positively and significantly associated (r=0..285, p=0.001). The results also indicated that Pupils' Gender and Pupils' BMI were negatively and not significantly associated (r=-0.026, p=0.390). Further, the results indicated that Mother Occupation and Pupils' BMI were positively and not significantly associated (r=0.104, p=0.128). Table 1also indicated that Father Occupation and Pupils' BMI were negatively and not significantly associated (r=-0.100, p=0.139). Furthermore, House hold size and Pupils' BMI were negatively and not significantly associated (r=-0.052, p=0.286). Finally, the results also indicated that Age of Pupils and Pupils' BMI were negatively and not significantly associated (r=-0.148, p=0.053).

Table 1: Correlations

		BMI of Pupils	Dietary Practice	Sanitation	Pupils' Gender	Mother Occupation	Father Occupation	House hold size	Age of Pupils
Pearson Correlation	BMI of Pupils	1.000	-.196	.285	-.026	.104	-.100	-.052	-.148
		-.196	1.000	-.526	-.141	.128	-.143	.145	.617
	Sanitation	.285	-.526	1.000	-.101	.211	.069	.006	-.509
	Pupils' Gender	-.026	-.141	-.101	1.000	.045	-.019	-.174	.041
	Mother occupation	.104	.128	.211	.045	1.000	.037	.036	-.001
	Father Occupation	-.100	-.143	.069	-.019	.037	1.000	-.248	-.025
	House hold size	-.052	.145	.006	-.174	.036	-.248	1.000	.041
	Age of Pupils	-.148	.617	-.509	.041	-.001	-.025	.041	1.000
Sig. (1-tailed)	BMI of Pupils		.016	.001	.390	.128	.139	.286	.053
		.016		.000	.062	.082	.059	.057	.000
	Sanitation	.001	.000		.137	.010	.228	.472	.000
	Pupils' Gender	.390	.062	.137		.315	.420	.029	.328
	Mother occupation	.128	.082	.010	.315		.346	.349	.495
	Father Occupation	.139	.059	.228	.420	.346		.003	.393
	House hold size	.286	.057	.472	.029	.349	.003		.327
	Age of Pupils	.053	.000	.000	.328	.495	.393	.327	
N	BMI of Pupils	120	120	120	120	120	120	120	120
		120	120	120	120	120	120	120	120
	Sanitation	120	120	120	120	120	120	120	120
	Pupils' Gender	120	120	120	120	120	120	120	120
	Mother occupation	120	120	120	120	120	120	120	120

Source: Field Work, (2016)

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.338[a]	.114	.059	.653

a. Predictors: (Constant), Age of Pupils, Mother occupation, Father Occupation, Pupils' Gender , House hold size, Sanitation, Dietary Practice

Source: Field Work, (2016)

The results presented in Table 2 present the fitness of model used for the regression model in explaining the study phenomena. Age of Pupils, Mother Occupation, Father Occupation, Pupils' Gender, House hold size, Sanitation and Dietary Practice were found to be satisfactory variables in Pupils BMI. This is supported by coefficient of determination also known as the R square of 11.4%. This means that Age of Pupils, Mother Occupation, Father Occupation, Pupils' Gender, House hold size; Sanitation and Dietary Practice explain 11.4% of the variations in the dependent variable which is Pupils BMI. This results further means that the model applied to link the relationship of the variables was satisfactory.

Table 3: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	6.165	7	.881	2.068	.053[b]
1	Residual	47.701	112	.426		
	Total	53.867	119			

a. Dependent Variable: BMI of Pupils

b. Predictors: (Constant), Age of Pupils, Mother occupation, Father Occupation, Pupils' Gender , House hold size, Sanitation, Dietary Practice

Source: Field Work, (2016)

Table 3 above provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically not significant. Further, the results imply that the independent variables are not good predictors of Pupils BMI. This was supported by an F statistic of 2.068and the reported p value (0.053) which was greater than the conventional probability of 0.05 at 95% significance level.

Table 4: Regression Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	2.077	.502		4.142	.000
	Dietary Practice	-.114	.109	-.136	-1.042	.003
	Sanitation	.166	.085	.229	1.955	.053
	Pupils' Gender	-.061	.127	-.046	-.484	.629
1	Mother occupation	.043	.049	.084	.876	.383
	Father Occupation	-.064	.037	-.159	-1.710	.090
	House hold size	-.045	.049	-.087	-.922	.358
	Age of Pupils	.019	.042	.054	.455	.650

a.   Dependent Variable: BMI of Pupils

Source: Field Work, (2016)

Thus, the optimal model for the study is;

BMI of Pupils = 2.077+ -.114x1 +.166x2+ -.061x3+.043x4+-.064x5+-.045x6+.019x7

Where; Dietary Practice, Sanitation, Pupils' Gender, Mother occupation, Father Occupation, House hold size and Age of Pupils explain only 11.4% of the variations in the dependent variable which is:

X1= Dietary Practice
X2= Sanitation
X3= Pupils' Gender
X4= Mother occupation
X5= Father Occupation
X6= House hold size
X7= Age of Pupils

Regression of coefficients results in Table 4 shows that Dietary Practice had a negative but significant effect on BMI of Pupils (r=-0.114, p= 0.003). Results from the regression analysis further indicated that Sanitation had a positive and no significant effect on BMI of Pupils (r=0. 166, p=0.053). It also shows that Pupils' Gender had a negative and no significant effect on BMI of Pupils (r= -.061, p=0.629). Results from the regression analysis further indicated that Mother occupation had a positive and non-significant effect on BMI of Pupils (r=.043, p=0.383) the results also indicated that Father Occupation had a negative and no significant effect on BMI of Pupils (r=-.064, p=0.090). Results from the regression analysis further indicated that House hold size had a negative and non-significant effect on BMI of Pupils (r=-.045, p=0. 358).Lastly, results indicated that Age of Pupils had a positive and no significant effect on BMI of Pupils (r=.019, p=0.650).

Discussion and Conclusions
Dietary practices, economic and environmental factors play a very important role in the nutrition status of the pupils. The aim of the study was to establish the factors affecting dietary intake of pupils in Bauchi. This study shows that 70% of the primary school pupils have normal weight while 19% are under weight, 6% over weight and 5% of the total sample are Obese due to their dietary intake. Other studies revealed that poorly nourished children tend to progress through school less rapidly, exhibit poor academic achievement and achieve less on cognitive achievement tests. Therefore it is important that consumption of adequate food is carried out in order to avoid nutritional disorders that interfere with pupils' education. Worthy nutrition can be accomplished through the intake of adequate energy giving foods and foods rich in nutrients such as proteins and protective foods (Weichselbaum, 2011).

Poor quality of latrines and sharing of communal water supply are likely to pose considerable risks of diseases. Better parental education has been shown to increase health and nutrition knowledge, which in turn increases the quality of pupils' diets.

Dietary practices among pupils in Bauchi primary schools were poor during the research exercise. This is in agreement with WHO, (2012) &Bamidele, et al, (2016), where it was concluded that individual nutrition status depends on interaction between foods eaten, overall state of health. The level of stunting of the pupils implied a similar past nutritional experience. Other studies had shown practically same levels in Nigerian pupils. The nutrition status of both girls and boys was not adequate. This resulted from inadequate food consumed. For instance it was evident in this research where it indicated that; 70% of the female have normal weight but 20% of them are underweight while, 5% are overweight and also 5% are obese while male pupils illustrations that; 70% of the total samples have normal weight, but 18% of the boys are underweight while, 7% of them are overweight and 5% of them are obese. This was therefore a contributing factor towards the poor nutrition status of the primary pupils, in Bauchi, even though most of the parents provided their primary pupils with inadequate foods despite limited finances. Most parents were jobless or they had low paying jobs. Therefore poor nutrition status of the Primary pupil in Bauchi was contributed by various factors as parents' occupation, economic factor, dietary practice, sanitation, meals taken per day and socio-demographic factors.

1. The study concludes that dietary intake had a negative but significant effect on BMI of Pupils;
2. The study also shows that sanitation had a positive but no significant effect on BMIof Pupils;
3. The study also shows that father and mothers' Occupation had a negative and no significant effect on BMI of Pupils;
4. It was discovered that house hold size had a negative and non-significant effect on BMI of Pupils;
5. The demographic factors of primary pupils (Age and gender of Pupils) had a positive and no significant effect on BMI of Pupils.

Recommendations
1. The war against malnutrition in the country by UNICEF should be encouraged and supported by public enlightenment campaign.
2. School's plans and packages that focus on promoting feeding practices and improving childhood nutrition should be intensified.

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