Influence of Socio-demographic Variables on the Nutritional Status of Primary School Children in Abuja Municipal Area Council, Abuja, Nigeria

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Abstract

Demographic variables have been implicated in the nutritional status of children globally and particularly in developing countries like Nigeria. There is a dearth of data on the nutritional status of school-age children that are 6-9 years old. This study examined the influence of demographic variables on the nutritional status of school-age children in a district in Abuja to ascertain their influence on the nutritional status of this group of children to proffer solution to findings that may cause harm to the children's nutritional status. A descriptive cross-sectional study was used. Multistage sampling was used to select 320 children in three government primary schools at AMAC, Abuja. Anthropometric measure was used to assess the nutritional status of the children using their body mass index (BMI) and percentile according to the specifications of Centre for Disease Control and Prevention. The summarized measurement was presented as underweight, normal weight and overweight; the relationship of demographic variables was determined with nutritional status of the children. Age, gender, school name, mothers' education, mothers' income, mothers' marital status and number of children in the family positively influenced the nutritional status of the children, while class level did not influence the nutritional status of the children. There is need for further research, with a larger group of pupils in this age-group to make a concrete assertion. Targeted health education on mothers and careers of school-age children to ameliorate negative effects of demographic variables on the nutritional status of school-age children.

Keywords: *anthropometric measure; demographic variables; Nigeria; nutritional status; school-age children.*

Introduction

Malnutrition is a silent emergency. Globally, and especially in Africa, nutritional problems in school-age children have been on the increase in the last 25 years (Belhassen-García et al., 2017). Malnutrition among children is a major public health problem especially in developing countries (Atawodi et al., 2015; Asiegbu et al., 2017; Igbokwe et al. 2017). It affects all aspects of children's health, including physical health, mental, social, and spiritual wellbeing. Malnutrition in children is the result of complex interaction of numerous and multifaceted factors. It is believed that majority of children in the developing countries including Nigeria are malnourished (Igbokwe et al. 2017). According to Upadhyay and Tripathi (2017), demographic factors and many other factors are responsible for nutritional status in individuals and children. Some of the factors include family size (number of children in the family), environmental and social factors which include economic condition, food-related myths, food fads and taboos, cultural influences, religious causes, early marriage, among others. In another study carried out by Adetunji et al., (2019), they observed that socio-demographic factors associated with overweight and obesity among primary school children in semi-urban areas of mid-western Nigeria, were from children born into families with a high income, higher levels of maternal education, low levels of physical activity, female gender and race, they further opined that such children have major risk factors to obesity and overweight which are detrimental to their health. This assertion expressly implicates socio-demographic variables in the nutritional status of school-age children in Nigeria.

Since the nutritional problems of school-age children is said to be on the increase, different age groups of school children need regular and constant assessment of their nutritional status to ensure adequate health. However, studies have reported that the nutritional status of school-age children (6-9 years) is generally under-reported and usually not included in health and nutrition survey globally. (Best, 2010; Lardner et al., 2015; Ayogu et al., 2018).

There is need to pay particular attention to the nutritional status of this age group because they are fast growing and approaching adolescent. In Nigeria, Igbokwe et al (2017) reported that 23% of the total population of Nigerians is made up of school-age children. It is pertinent to assess the nutritional status of children to forestall any disease which children will be more vulnerable when they have poor or weak nutritional status. Anthropometric examination is the cornerstone for assessment for health and nutritional

condition in children. The objective of this study therefore was to determine the influence of selected demographic variables on the nutritional status of school-age children 6-9 years old in a district in Abuja Nigeria so that necessary measures and health education can be proffered to improve the nutritional status of children affected by the variables. Abuja, the federal capital of Nigeria appears not to have many studies on nutritional status of school-age children, as such, it is deemed fit for this study as well as for its strategic position in the country. It determined the relationship of the children's' anthropometric measures and their selected demographic variables (age, gender, class, school, number of children in family, mothers' marital status, mothers' education, and income).

Statement of Problem

Malnutrition is a major factor underlying children mortality, especially primary school children. Studies have implicated socio-demographic variables in the increase of malnutrition among children of all ages (Ndemwa et al., 2017; Tewabe & Belachew, 2020). Since it has been reported that the nutritional status of school-age children is under reported generally, Nigeria inclusive , this study was carried out to ascertain the true position of demographic variables on the nutritional status of school-age children in Abuja Nigeria in order to further prevent mortality from malnutrition

Research questions

The following research questions were answered in the course of this study

1. Will gender and age of school-age children influence their nutritional status?
2. Will the school attended by school-age children influence their nutritional status?
3. Will the class (study level) influence the nutritional status of school-age children?
4. Will number of children in the family influence the nutritional status of school-age children?
5. Will mothers' educational level influence the nutritional status of school-age children?
6. Will marital status of mother influence the nutritional status of school-age children?
7. Will mothers' monthly income influence the nutritional status of school-age children?

Methodology

Study design: A cross - sectional study of school- age children (6-9 years) in L.E.A. AMAC Abuja between October and November 2019. The cross-sectional study design was adopted because it does not allow for any manipulation of factors and provides population characteristics as they are at one point in time (Kesmodel, 2018).

Sample size: Yamane's formula (Adam, 2020) was used to calculate sample size using the formula:

$$n = \frac{N}{(1+Ne)2}$$

n= sample size

N=population under study (1,600 children)

e = margin of error (MoE), e = 0.05

This implies that:

$$n = \frac{1600}{1+1600(0.05)2}$$

$$n = \frac{1600}{1+1600\ (0.0025)} = 320$$ (Although, 350 children were selected for the study to take care of attrition).

The final number of children that participated in the study were 320 children (9% attrition).

Study area: The study area is Local Education Authority (LEA) primary schools in Abuja Municipal Area Council (AMAC), Federal Capital Territory (FCT), Abuja Nigeria. It is located on the eastern wing of the Federal Capital Territory. Abuja Municipal Area Council (AMAC) has five (5) zones with five (5) Local Education Authority (LEA). The zones are: Airport Zone, Karmo Zone, City Centre Zone, Kabusa Zone and Karshi Zone (Abuja City Population, 2019).

Inclusion criteria: Children aged 6-9 years, enrolled in any of the selected registered public primary schools in LEA AMAC Abuja

Exclusion criteria: Children with skeletal deformities, or those that were on medications known to affect growth such as steroids were excluded from the study.

Sampling technique: data was collected within a period of four weeks and analyzed once for the period as follows: Multistage sampling technique was used to select the required sample size. Simple random sampling was used to select three zones out of the

five zones in AMAC. The selected zones are City centre zone, Airport zone, and Karshi zone. Children who met the predetermined criteria of 6 -9 years old in primary 1 - 3 were informed through their teachers to be available for the study. Purposive sampling technique was used to select the most populous school from each selected zone to have enough participants for the study following the study criteria. Systematic sampling technique was used to select the participants from each of the three selected schools. The total population of age-group 6 -9 years in the three schools was 1600, this was divided by the calculated sample size; therefore, 1600/350 gave 4.6, the 5^{th} interval was used to select from each school (see table 1).

Table 1: Selected Zones, Schools and Pupils

Selected Zone	Selected School	No. of pupils in selected school	No. of pupils selected for the study
Karshi Zone	LEA primary school Karu central	640	138
City Center Zone	LEA primary school Durumi ll	410	92
Kabusa Zone	LEA primary school Aleyita	550	120
		Total = 1600	350

*Finally, 320 children took part in the study, showing 9% attrition.

The children were assessed for nutritional status by using questionnaire as well as anthropometric assessment compared with the standard global data from the Centre for Disease Control and Prevention (CDC), 2020.

Data analysis

Data was analyzed using descriptive statistics of percentages, mean, frequency for demographic variables and to answer the research questions with the Statistical Package for the Social Sciences (SPSS) 20. Inferential statistics of T-test and Regression for testing the variables under study at 0.05 significant level.

Ethical approval: Ethical approval was obtained from the Education Secretary, L.E.A. AMAC FCT, Abuja. This was registered as LEA/AMAC/PROJECT/86VOL.1. Mothers were provided with detailed information about the study in writing and an informed

consent was obtained from them prior their children's involvement in the study. All information collected was treated with utmost confidentiality.

Results

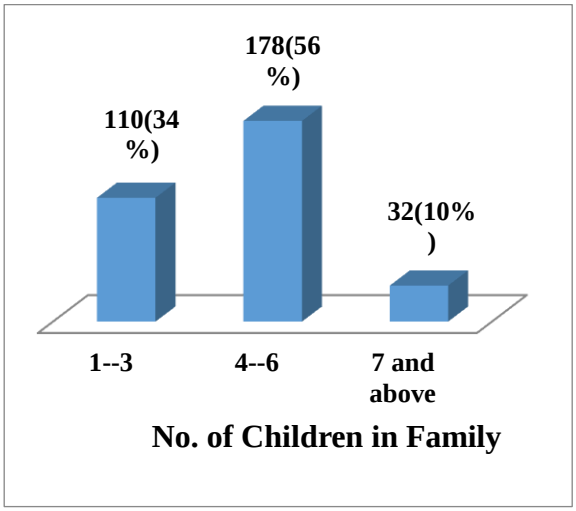
Table 2: Gender, age, class, and school distribution of School-age children

	Frequency	Percentage (%)
Gender		
Male	148	46.3
Female	172	53.7
Age (Years)		
6	74	23.1
7	66	20.6
8	112	35.0
9	68	21.3
Schools		
LEA primary Karu central	132	41.3
LEA primary school Durumi ll	83	25.9
LEA primary school Aleyita	105	32.8
Class		
Pry 1	100	31.3
Pry 2	108	33.8
Pry 3	112	35.0

Field Survey, 2019.

In table 2, more females participated in the study. 172 (53.7%) of the pupils were female and 148 (46.3%) participants were male pupils. For age distribution of participants, 112 (35.0%) participants were 8 years old; 74 (23.1%) participants were 6 years old; 68 (21.3%) participants were 9 years old, and 66 (20.6) participants were 7 years old. Also, for class distribution, pupils in primary 1 were 132 (41.3%), primary 3 were 105 (32.8%) and primary 2 were 83 (25.9%).

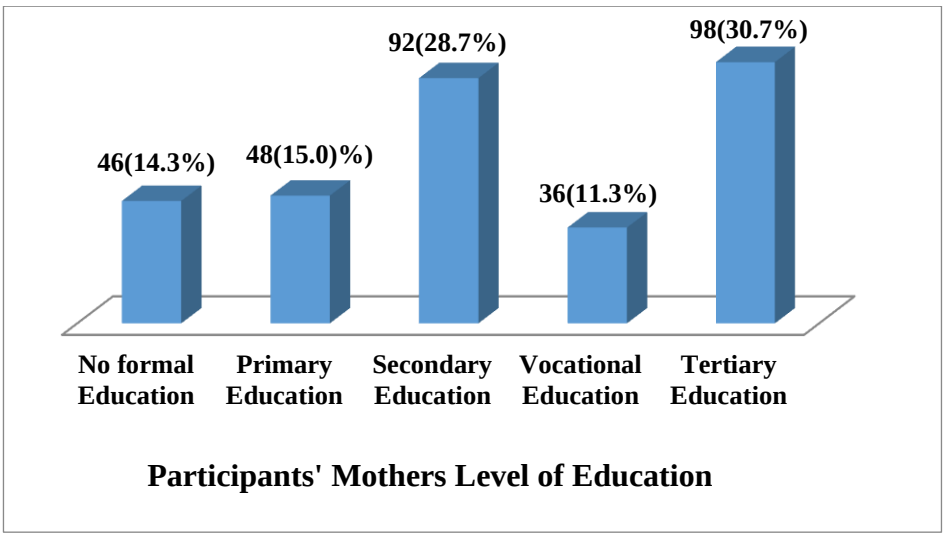
Figure 1: Bar Graph Distribution of Participants by Number of Children in the Family



Field Survey, 2019

Figure 1 shows bar graph distribution of respondents by number of children in the family. 178 (56%) pupils had 4-6 children in their family; 110 (34%) respondents had 1-3 children and 32 (10%) had 7 and above children in their family.

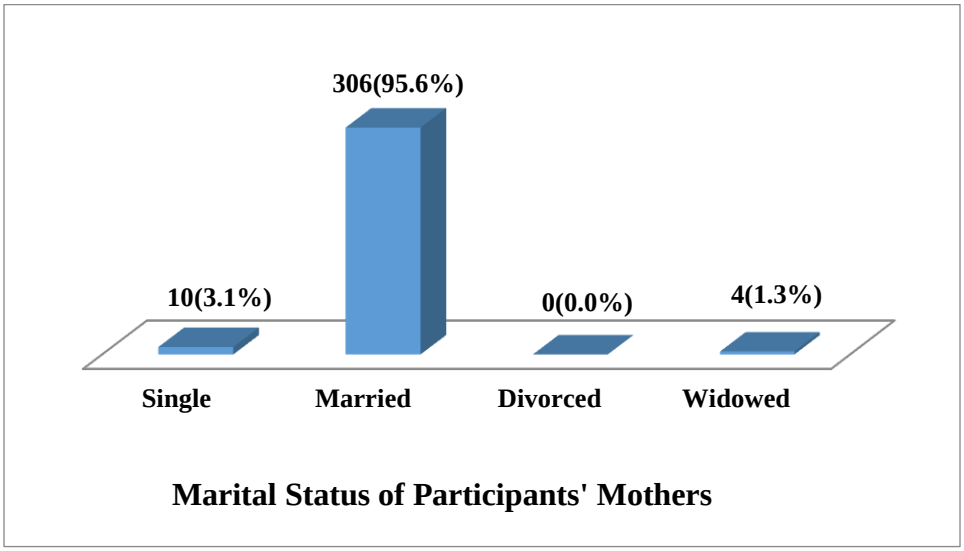
Figure 2: Bar Graph Distribution of Participants' Mothers Level of Education



Field Survey, 2019

Figure 2 describes bar graph distribution of respondents' mothers' level of education. 98 (30.7%) participants' mother had tertiary education; 92 (28.7%) had secondary education; 48 (15.0%) had primary education; 46 (14.3%) had no formal education and 36 (11.3%) participants' mother had vocational education.

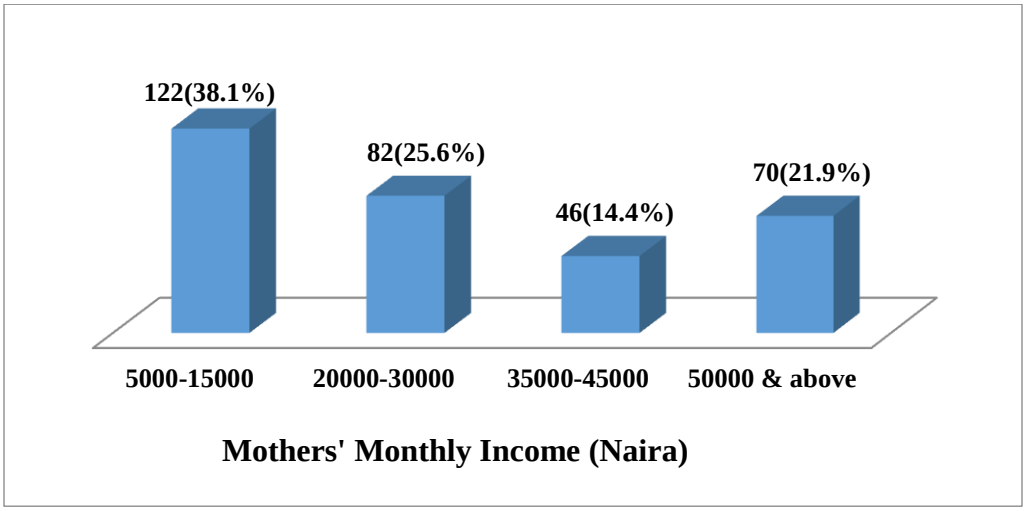
Figure 3: Bar Graph Distribution of Participants' Mothers Marital Status



Field Survey, 2019

Figure 3 reveals bar graph of participants' mothers by marital status. About 95.6% of the participants' mothers were married; 10 (3.1%) were single; 4 (1.3%) participants' mothers were widowed and none of the participants' mothers was divorced. The single mothers were 10 (3.1%).

Figure 4: Bar Graph Distribution of Participants' Mothers Monthly Income



Field Survey, 2019

Figure 4 describes bar graph distribution of participants' mothers' monthly income. 122 (38.1%) participants' mothers earn between #5,000 and #15,000 monthly; 82 (25.6%) earn #20,000-#30,000 monthly; 70 (21.9%) earn #50,000 and above monthly and 46 (14.4%) participants' mothers earn between #35,000 and #45000 monthly. The result indicated that majority of the participants were below average living.

Table 3 Summary of Pupils' Nutritional Status using Anthropometric Measures

Gender	Nutritional Status				Total	
	Underweight		Normal		Overweight	
Boys	36 (24.3%)		112 (75.7%)		Nil	148
Girls	46 (26.7%)		126 (73.3%)		Nil	172
Age (in years)	Boys	Girls	Boys	Girls	Nil	
6	10	18	24	22	"	74
7	8	10	16	32	"	66
8	14	12	36	50	"	112
9	4	6	36	22	"	68
Total	36	46	112	126	"	320

From table 3 above, the total number of boys and girls underweight (< 5th percentile) were 82 (25.6%) of the total number of participants; this implies that these children were malnourished, with the girls being slightly more malnourished than the boys. Also, six years old and 8 years old appear to be more underweight.

Recommended BMI-for-age cutoffs (BMI (Body Mass Index) = $\frac{Weight\ in\ kg}{height\ square\ in\ m}$

≥95th percentile = Overweight
85th to < 95th percentile = Risk of overweight
5^{th} to < 85^{th} percentile = Normal weight
< 5th percentile = Underweight

*** Percentile calculated using Centre for Disease Control and Prevention (CDC) BMI percentile calculator (CDC 2020).**

Table 4: Regression Analysis of Pupils' School and Pupils' Nutritional Status

Model	**Unstandardized Coefficient**		**Standardized Coefficient**	**T**	**Sig.**
	Beta	**Std. Error**	**Beta**		
(Constant)	18.107	3.895		4.648	.000
LEA					
Durumi 11	5.375	.618	.608	8.697	.000
LEA Karu	4.028	.668	.437	6.029	.022
LEA Aleita	4.187	.915	.404	4.576	.031

Dependent variable: Pupils' Nutritional Status

The result 4 of table above shows relative pupils' nutritional status as regards the school they belong: LEA Durumi 11 (β = .608; P < .05); LEA Karu central (β = .437; P < .05) and LEA Aleita (β = .404; P < .05). From the analysis, all categories had significant relationship between pupils' school and their nutritional status though the variation in the level of significance may be due to other variables. This result implies that there is significant difference in the nutritional status of pupils in LEA Durumi 11, LEA Karu central and L.E.A Aleita in AMAC Abuja.

Table 5: Regression Analysis of Pupils' Class and Nutritional Status

Model	Unstandardized Coefficient		Standardized Coefficient	T	Sig.
	Beta	Std. Error	Beta		
(Constant)	4.754	.907		5.241	.000
Primary 1	1.042	.476	.093	2.189	.073
Primary 2	.906	.406	.138	2.231	.066
Primary 3	1.075	.457	.017	2.352	.108

Dependent variable: Pupils' Nutritional Status

The result of table 5 above shows relative nutritional status of primary school pupils as regards their classes: Primary 1 ($\beta = .093$; $P > .05$); Primary 2 ($\beta = .138$; $P > .05$) and Primary 3 ($\beta = .017$; $P > .05$). From the analysis, none of the classes was significant as regards pupils' class and their nutritional status.

Table 6: Number of Children in Pupils' Family and Pupils' Nutritional Status

Model	**Unstandardized Coefficient**		**Standardized Coefficient**	**T**	**Sig.**
	Beta	**Std. Error**	**Beta**		
(Constant)	15.319	3.484		4.397	.000
1-3	4.250	.884	.321	4.808	.000
4-6	3.699	.856	.226	4.321	.003
7 and above	2.309	.718	.027	3.216	.012

Dependent variable: Pupils' Nutritional Status

The result of table 6 above shows relative pupils' nutritional status as regards number of children in respondents' family: 1-3 ($\beta = .321$; $P < .05$); 4-6 ($\beta = .226$; $P < .05$) and 7 and above ($\beta = .027$; $P < .05$). From the analysis, all categories had significant relationship between number of children in the family and pupils' nutritional status. The variation in the level of significant is because of number of children in pupils' family..

Table 7: Mothers Level of Education and Nutritional Status of children

Model	Unstandardized Coefficient		Standardized Coefficient	T	Sig.
	Beta	Std. Error	Beta		
(Constant)	11.762	3.304		3.560	.000
No formal Edu.	3.260	.873	.174	3.734	.020
Primary Edu.	2.523	.712	.293	3.543	.004
Sec. Education	3.585	.806	.318	4.448	.001
Voc. Education	3.530	.724	.469	4.876	.000
Tertiary Edu.	4.343	.648	.697	6.702	.000

Dependent variable: Nutritional Status

The result of table 7 above shows mothers' educational level and the influence on the nutritional status of the children. No formal education ($\beta = .174$; $P < .05$); Primary education ($\beta = .293$; $P < .05$); Secondary education ($\beta = .318$; $P < .05$); Vocational education ($\beta = .469$; $P < .05$) and tertiary education ($\beta = .697$; $P < .05$). From the analysis, mothers' educational level had significant relationship on nutritional status of the primary school pupils. Though, the level of significance varies from no formal education to tertiary education.

Table 8: Regression Analysis of Mothers' Marital Status on Nutritional Status

Model	Unstandardized Coefficient		Standardized Coefficient	T	Sig.
	Beta	Std. Error	Beta		
(Constant)	**12.135**	**2.526**		**4.804**	**.000**
Single	**5.800**	**1.732**	**.396**	**3.349**	**.001**
Married	**4.190**	**1.861**	**.564**	**2.251**	**.000**
Divorced	**-**	**-**	**-**	**-**	**-**
Widowed	**3.337**	**1.658**	**.382**	**2.013**	**.003**

Dependent variable: Nutritional Status

The result of table 8 above shows mothers' marital status on the nutritional status of children: Single (β = .396; P < .05); Married (β = .564; P < .05) and widowed (β = .382; P < .05). From the analysis, there is relative significant relationship between mothers' marital status and nutritional status of primary school pupils in AMAC Abuja.

Table 9: Regression Analysis of Mothers' Monthly Income and Nutritional Status of Pupils

Model ('000)	**Unstandardized Coefficient**		**Standardized Coefficient**	**T**	**Sig.**
	Beta	**Std. Error**	**Beta**		
(Constant)	13.727	3.318		4.137	.000
5-15	.187	.469	.148	.398	.271
20-30	1.219	.476	.343	2.561	.032
35-45	1.347	.519	.351	2.595	.020
50 & above	2.971	.779	.484	3.814	.000

Dependent variable: Nutritional Status

The result of table 9 above shows mothers' monthly income and nutritional status of primary school children: #5000-#15000 (β = .148; P > .05); #20000-#30000 (β = .343; P < .05); #35000-#45000 (β = .351; P < .05) and #50000 and above (β = .484; P < .05). From the analysis, the level of significance varies from participants' mothers' monthly income. While 20000-30000; 35000-45000 and 50000+ were significant, 5000 -15000 was not. This implies that mothers with low income negatively influence nutritional status of children.

Discussion

A total of 320 school-aged children (6-9 years) were studied to assess the relationship between demographic variable and the nutritional status of school-age children in a district in Abuja, Nigeria Out of the 320 pupils studied, 148 were boys and 172 were girls; all the ages 6-9 years were well represented in the study with 8 years old being the largest group followed by 6 years (table 2). The pupils in primary 3 were the most available for the study and LEA primary school Karu had the largest number of participants. This observed participation is because the school had the largest population. From the result, the gender and age of the pupils had significant influence on their

nutritional status (see tables 3). The girls appeared slightly more malnourished than the boys. This finding supports the report of Kunwar and Pillai (2017) where they observed that dietary inadequacy was more pronounced in girls than boys; also, that the signs of nutritional disorders were more frequent in girls than boys. This disparity in nutrition may be more noticeable in developing countries like Nigeria; they may be due to differences in study frame, family setups, gender bias and parental preferences for male children where some parents still give more attention and care to the male child than the female child (Srivastava et al., 2012). The relationship of age on the nutritional status of the children shows that children that were 6 and 8 years old presented with more cases of underweight, signifying malnutrition (table 3). This buttresses the need for this study, to pay more attention on the nutritional status of children in this age-group so that they do not develop chronic malnutrition as they grow which will be detrimental to their physical, mental, and social wellbeing as they are still growing actively.

In considering if there was an influence of the school attended on nutritional status of the children (table 4). It was surprising to find out that the school attended have influence on the nutritional status, taking into consideration that the three schools used for this study had similar characteristics. Other studies that observed influence of school on nutritional status of school-age children compared public schools with private schools or schools that had feeding programmes in place (Owusu et al., 2017). In our study, there was no defined feeding programme in place, and they were all public schools. However, it is suspected that other variables like home feeding pattern, vendors that come to sell food in the different schools, teachers' health talk/education may have brought about the significant influence noticed in the disparity of nutritional status in the schools. On the other hand, the study level of the students by class appeared not to have any significant relationship with the nutritional status of the children (table 5). This again, is another controversial outcome as one would have expected the class of study to influence nutritional status of the children since the younger ones are in the lower classes and the older ones are in the higher classes (that is primary 3). These two findings of school attended and class of study influence on nutritional status of the children will need to be further researched to be able to draw a more concrete conclusion.

The number of children in the family significantly influence the children's nutritional status. From the result in table 6, one can infer that the smaller the number of children in the family, the better the nutritional status of the children. This finding confirms the findings in previous studies where it was reported that the fewer the number

of children in a family, the better the nutritional status of the children (Ajao et al., 2010; Galgamuwa et al., 2017). Mothers' education also showed a signifant influence on the nutritional status of the children (table 7). The higher, the level of education of the mothers, the more positive influence on the nutritional status of the children.in this study, majority of the mothers have secondary school and tertiary education (Abuya et al., 2012). It has been reported in similar studies that illiteracy of mothers is an uncontroversial predictor of poor nutritional status. Children of mothers without formal education have been said to be four times more to have poor nutritional status compared to children of educated mothers. Thus, the nutrition status of elementary school age children will benefit most by increasing the general level of education for those adults who are presently least educated (Ajao et al., 2010; Srivastava et al., 2012; Iftikhar et al., 2017). Marital status of mothers is another important variable in this study. Majority of the mothers of the participants in this study were married (fig 3). However, in comparing the marital status on nutritional status of the children, married women, single and widowed all had significant relationship showing positive nutritional status of the children (table 8). This outcome is controversial because previous studies reported that children of single mothers usually have poor nutritional status except those of married and widowed women (Ntoimo & Odimegwu, 2014; Laksono et al., 2019). Finally, mothers' income was assessed with the nutritional status of the participants. The result revealed that the mothers with relatively high income (above 15, 000) had significant relationship with the nutritional status of school-age children (table 9). This infers that the higher the mothers' income, the higher the nutritional status of the children. This confirms the findings from similar studies where it was reported that mothers with low income have malnourished children or children with poor nutritional status (Igbokwe et al., 2017; Ayalew et al., 2020).

Conclusion

From the results of this study, most of the demographic variables tested on the nutritional status of the school-age children appeared to influence the nutritional status of children. However, some of the findings are quite striking and differ from many reviewed literatures. Children that were 6 years and 8 years old appear to be more affected by poor nutritional status, the class level of study of the pupils contrarily appeared not to influence their nutritional status and marital status of mothers was significant on nutritional status of the children, irrespective of mothers' marital status. These findings

pose the need for further research, perhaps with a larger group of pupils in this age-group to make a concrete assertion. Finally, there is need for targeted health education on mothers and careers of school-age children to ameliorate the negative effects of the influence of demographic variables on the nutritional status of school-age children.

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