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ORIGINAL ARTICLE

EVALUATION OF NUTRITIONAL STATUS AMONG SCHOOL-AGED CHILDREN IN RURAL KWAHU-EASTERN REGION, GHANA; ANTHROPOMETRIC MEASURES AND ENVIRONMENTAL INFLUENCES

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ABSTRACT

School-age children in developing countries are particularly vulnerable to undernutrition as the priority of nutritional interventions focus on fetal development and the first years of life. This study examines anthropometric indices of school-age children in five communities located in rural Kwahu-Eastern Region, Ghana, West Africa and discusses environmental influences that contribute to their nutritional and growth status. Anthropometric indices of heights and weights were obtained from 411 school- aged children, (5-12 years old) in 5 villages (Asakraka, Awiseasu, Miaso, Oframase and Oworobong) during June 2012. Anthropometric parameters and influences that contributed to nutritional status (environmental, health facilities, availability of markets and gender) were assessed. Factorial ANOVAs were conducted with age, gender and village as factors for the z-score for 'BMI-for-age' and the z-score for 'height-for-age'. The z-score of 'BMI-for-age' showed a significant two-way interaction effect between 'Age' and 'Village', $F (4, 391) = 6.06$, p-value < 0.001, $\eta 2 = 0.06$. The mean z-score for 'BMI- for-age' was significantly lower for older children in Oframase. The z-score of 'Height-for-age' showed a small but significant three-way interaction effect among 'Age', 'Gender', and 'Village', $F (4, 391) = 3.79$, p-value $= 0.005$, $\eta 2 = 0.04$. The mean z-score for 'Height-for-age' was significantly lower in older children (ages 10-12 years) in all villages except Asakraka. Lower mean z-score for 'Height-for-age' in older children (ages 10-12 years) remains to be significant in boys in villages of Awiseasu and Oworobong and in girls in villages of Awiseasu, Miaso and Oframase. Children in isolated communities are at increased risk for lower z-scores in 'Height-for-age' and 'BMI-for-age'. Communities with a clinic, paved road and established infrastructure did not demonstrate evidence of chronic malnutrition. Acute malnutrition in the form of lower z-scores was demonstrated in older children in Oframase. Gender disparities are present and increased awareness of the nutritional status of girls needs to be addressed.

Keywords: Nutrition, School children, Ghana, Environment

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INTRODUCTION

Childhood malnutrition continues to be a public health problem of school-aged children in resource limited countries. Nutritional status is mainly measured by growth in height and weight and is affected by food intake and incidence of childhood infections. Of the 7.6 million deaths reported by the World Health Organization (WHO) in 2010, 64% were attributable to infectious causes including pneumonia, diarrhea and malaria which claimed the most lives [1]. But their severity is greater when confounded by chronic malnutrition especially in children who are unable to mount an effective immune response [2, 3]. Although the United Nations (UN) Millennium Development Goal Number One continues to strive for the eradication of extreme poverty and hunger, the Food and Agriculture Organization (FAO) of the UN estimates 805 million people are still chronically undernourished globally in 2012–14 [4]. They also predict that neither the World Food Summit target nor the Millennium Development Goal to reduce malnutrition and hunger by half before the year 2015 will be achieved [5].

The health burden of malnutrition, both acute and chronic, in resource limited countries has allowed for the implementation of programs designed to partially address the problem. For example, Multiple Micronutrient Powders (MNPs) or Ready to Use Foods (RUFs) offer a low cost, acceptable way to supplement intake by adding iron, vitamins, proteins and fats. This has been shown to improve health parameters for anemia and zinc deficiency [6, 7]. Other initiatives, with support from the WHO, have also demonstrated significant improvement of health parameters. National-scale fortification including adding micronutrients to staple foods in factories has proved to be an effective method to improve the health of populations. Flour is commonly fortified with iron, zinc, folic acid and other B vitamins such as thiamine, riboflavin, niacin and vitamin B12. Because of its success, wheat flour fortification is now mandated in 79 countries compared with only 33 countries in 2004 [8, 9].

Other interventions have focused on a community level. Since the majority of school-aged children in developing countries who attend school often walk long distances to school without having a morning meal, a mid-day meal takes on greater importance [10]. School lunch programs have improved school enrollment, increased attendance, decreased dropout rates and raised nutrition levels among the children. Countries like India have created public-private partnerships and large scale programs which feed an estimated 1.3 million underprivileged children in 9000 schools across the country every day as part of an aggressive nutrition campaign [11]. These and other early nutrition interventions have also significantly improved health outcomes, increased school performance and decreased the burden of childhood disease [12, 13, 14].

Ghana has experienced positive social and economic changes affecting dietary intake patterns but food security remains a challenge in rural areas. The population most vulnerable continues to be the young. The FAO reports that in Ghana, 22% of children under five years of age are stunted indicating chronic malnutrition ('height-for-age' z-score< - 2) and five percent are wasted, indicating acute malnutrition ('weight-for-height' (BMI) for age z-score< - 2) [15]. Available databases for nutrition surveillance from WHO focus mostly on children under the age of 5[16]. It is proposed that understanding of the prevalence of negative growth parameters, targeting the location, investigating site appropriate and expanded interventions and continuous monitoring of nutritional status by local teams and public health advocacy can be applied to school-aged children to prevent chronic malnutrition.

Village resources and the local environment may affect the growth parameters for children. The purpose of the study was to investigate the nutritional status of school children, aged 5 - 12 years in rural settings since there is a lack of data regarding regional discrepancies in urban versus rural

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populations in this age group [17]. Each of the villages surveyed had different resources or barriers to food availability. Barriers included mountain remoteness and access via paved roads. Resources included the presence of a weekly market in town, a newly implemented school lunch program and availability of a health clinic. Closer consideration of these environmental factors and how they interact will allow for improved planning and development by governmental and non-governmental agencies. It is hypothesized that children in the area will present with wasting, stunting and underweight status as they are manifested by z-scores depending on their interaction with the environmental factors, highlighting the importance of resources and barriers that can affect the nutritional status of school- aged children.

MATERIALS AND METHODS

Subjects

This is a cross-sectional study of school- aged children conducted in June, 2012. Subjects, aged 5 to 12 years, were recruited from public elementary schools in five different villages (Asakraka, Awiseasu, Miaso, Oframase and Oworobong) in Kwahu, Eastern Administrative region of Ghana. These communities were chosen based on the relationship that the academic institution of the researchers has with the health clinic servicing the area. All children at the school during the duration of the study were invited to participate in the study. Verbal informed consent to participate was provided by parents or guardians of the children.

Body weight was determined to the nearest 0.1 kg on a generic medical digital scale and height was measured to the nearest 0.1 cm using standard medical techniques with a tape measure. Basic anthropometric indices (height/stature, weight) were recorded, and a simple standardized survey including demographic information was completed by twenty researchers trained by an academic registered dietitian and physician. Ten local university students were used to translate from Twi to English. Rather than 'weight-for-age', 'BMI-for –age' is recommended by the WHO and US CDC to assess thinness/wasting in school age children and adolescents. Established international measures of wasted ('weight-for-height' (BMI)-for age z-score < - 2) indicating acute malnutrition; underweight, ('weight-for-age' z-score< - 2) indicating any protein energy malnutrition; and stunted, ('height-for-age' z- score< - 2) indicating any protein energy malnutrition; and stunted, ('height-for-age' z- score< - 2) indicating chronic malnutrition were used [18 ,19]. Any child who was found to be at extreme risk of malnutrition was referred immediately by the research team to the nearest appropriate medical facility and treated with country specific standard of care.

Research area

The research area is located approximately four hour drive from the Capital of Accra in the Kwahu-Eastern region. This is a mountainous agricultural community of subsistence farmers as shown in Figure 1 [20]. According to The Composite Budget of the Kwahu East District Assembly for the 2012 Fiscal Year, the economic base of the district is agriculture, with 71.8% of the rural labor force involved in agriculture and agriculture related activities. The region lacks a permanent market infrastructure. Commerce is supported mainly by trading with only eight periodic markets throughout the 860 square kilometers of the region. Many areas of the region lack proper infrastructure including paved roads and electricity [21].

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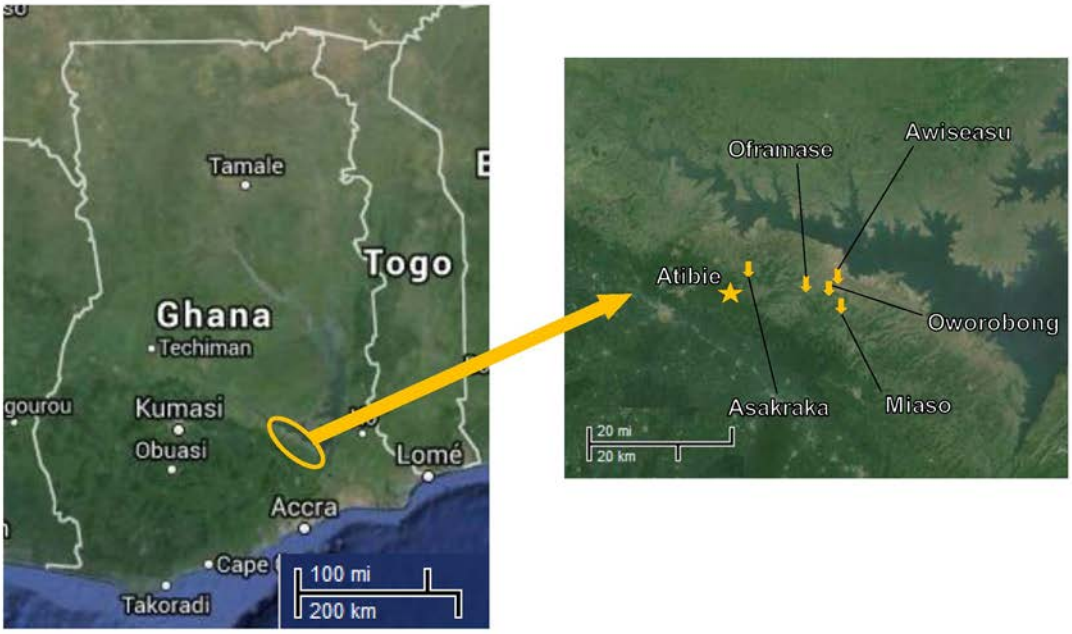

Figure 1: Google map Image of Kwahu Eastern region, and study villages [19]

Statistical analysis

The final data were compiled, de-identified and anthropometric indices of 'weight- and height-for- age' z-scores were calculated for each village with the WHO program "Anthro plus" using 2007 reference values for 5-19 year old subjects [22]. The z-scores for 'weight-for-age' were calculated only for the children less than 10 years of age, since weight-for-age is not a good indicator in children above 10 years of age as this is often related to increased hormonal growth [23]. Data were entered into and analyzed using IBM SPSS Statistics 20. Continuous data were presented as median with range or mean ± SD, and categorical data were presented as frequency and proportions. For continuous variables, t-tests were used for comparisons between two groups, and one-way analyses of variance (ANOVA) for comparisons among more than two groups. Factorial ANOVAs were also used to detect any multi-way interaction between factors. The level of statistical significance was set at 0.05 for all analyses. Partial Eta Squared ($\eta 2$) was calculated to assess the effect size.

Ethical Considerations

This study was reviewed and approved by the Institutional Review Board (IRB) at the New York Institute of Technology (NYIT). (BHS-846) The Noguchi Institute at the University of Ghana, Accra was contacted to determine if there were any country specific concerns that needed to be addressed prior to the implementation of this project.

RESULTS

A total of 411 children were recruited for the study. The demographic data and nutrition characteristics of children in the study are shown in Table 1. For all children aged 5 – 12 years, there were no significant differences among the 5 villages for the mean z-scores of Height-for-age, F (4, 406) = 1.53, p-value = 0.19; There was, however, a significant difference between the villages for the mean z-scores of BMI-for-age, F (4, 406) = 5.31, p-value < 0.001. A post hoc analysis of Hochberg revealed a significant difference between the pairs of 'Asakraka' and 'Awiseasu' (M= -1.38, SD=0.79; M=-1.92, SD=0.93; p-value = 0.04), 'Awiseasu' and 'Oworobong' (M=-1.92, SD=0.93; M=-1.26, SD=0.79; p-value < 0.001), and 'Oframase' and 'Oworobong' (M=-1.69, SD=1.25; M=-1.26, SD=0.79; p-value = 0.03). There was no significant difference between the groups of 'Male' and 'Female' in any of the five villages as well as a whole for the mean z-scores of either Height-for-age or BMI-for-age. However, when datasets were analyzed comparing between the younger (aged of 5 – 9 years) and the older (aged of 10 – 12 years) children stratified by 'Gender' and 'Village', significant differences were detected in many pairs of strata for the mean z-scores of either Height-for-age and BMI-for-age (Table 2). To further study possible interaction effects among the stratifying factors, factorial analysis of variance (ANOVA) was conducted with 'Age', 'Gender' and 'Village' as its three independent factors for 'the z-score of Height-for-age' and 'the z-score of BMI-for-age', respectively.

For 'the z-score of BMI-for-age', it showed a small but significant two-way interaction effect between 'Age' and 'Village', F (4, 391) = 6.06, $\eta 2 = 0.06$, p-value < 0.001.

This indicates that the difference of the mean z-score of 'BMI-for-age' between the younger (ages 5 – 9) and older (ages 10 – 12) children was different by 'Village'. Specifically, the mean z-score of 'BMI-for-age' was similar in younger and older children in villages 'Asakraka' (M=-1.35, SD=0.81; M=-1.56, SD=0.65), 'Awiseasu' (M=-1.77, SD=0.93; M=-2.01, SD=0.99), 'Miaso' (M=-1.36, SD=0.92; M=-1.62, SD=0.92), and 'Oworobong' (M=-1.24, SD=0.84; M=-1.31, SD=0.71); in 'Oframase' village, however, the mean z-score of 'BMI-for-age' was significantly lower in older children (M=-2.76, SD=1.42) than younger children (M=-1.30, SD=0.92).

The 'z-score of Height-for-age' showed a small but significant three-way interaction effect among 'Age', 'Gender', and 'Village', F(4, 391) = 3.79, $\eta 2 = 0.04$, p-value = 0.005.

This indicates that the difference of the mean z-score of 'height-for-age' between the younger (ages 5 – 9) and older (ages 10 – 12) children was different by 'Gender' and 'Village'. Specifically, the mean z-score of 'height-for-age' was similar in younger and older boys in villages 'Asakraka' (M=-0.58, SD=1.41; M=-1.44, SD=0.94), 'Miaso' (M=-1.04, SD=1.05; M=-1.53, SD=0.66), and 'Oframase' (M=-1.23, SD=1.09; M=-1.99, SD=1.14); however, it was significantly lower in older boys than younger boys in villages 'Awiseasu' (M=-0.19, SD=1.30; M=-1.43, SD=0.67) and 'Oworobong' (M=-0.48, SD=1.58; M=-1.89, SD=0.67). On the other hand, the mean z-score of 'height-for-age' was similar in younger and older girls in villages 'Asakraka' (M=-0.70, SD=0.77; M=-0.58, SD=0.00) and 'Oworobong' (M=-0.83, SD=0.99; M=-1.30, SD=1.01); however, it was significantly lower in older girls than younger girls in villages 'Awiseasu' (M=-0.55, SD=0.79; M=-1.54, SD=0.68), 'Miaso' (M=-0.25, SD=1.66; M=-1.40, SD=0.85) and 'Oframase' (M=-0.53, SD=1.16; M=-2.91, SD=0.84).

DISCUSSION

Reference Choice

The researchers chose to use the 2007 WHO established z - scores for children and adolescents aged 5-19 years old of 'BMI-for-age' and 'height-for-age' to facilitate future longitudinal studies. In 2006, a standard was created that represented optimal growth potential, particularly in a developing country, and a new WHO 2007 reference for school-aged children was created which describes the normal distribution of a population [23].

The initial ANOVA and following post hoc analysis uncovered small but significant differences between ages 5-9 and 10-12 years in the mean z-score for some of the growth parameters. The data indicates that children in these communities are at increased nutritional risk as they enter adolescence. Early recognition of negative indicators could trigger earlier interventions for these children especially since previous research has shown that entering adolescence while malnourished increases risk factors for diseases and premature death [24].

Analysis of the data also reveals that where one lives correlates with their growth parameters. The two communities most at risk are Awiseasu and Oframase, with the lowest negative mean z-score for 'BMI-for-age'. Why there would be a difference is likely multifactorial. Each of these villages has specific characteristics which affect the food availability in the community. Several of those influences are proposed below.

Environmental influences on nutritional status

1. Awiseasu is a remote mountain community with little infrastructure making accessibility via vehicle extremely difficult

This community had one of the lowest mean 'BMI -for –age' z-scores (-2.03 for males and -2.12 for females). The data demonstrates a significant difference between older and younger age group in stunting ('height-for-age' z-score) for both males and females. Rural children are often on the fringes of the food supply and selection is limited due to the expense of importing food to isolated locations. Nutritional intake in these communities comes from what is grown, hunted or gathered [25]. In areas that are agriculturally based, food security is dependent on uncontrollable variables such as monsoon or drought. The reallocation of personal economic resources in times of famine from food purchase to immediate necessities can result in a prolonged period of hunger and nutrient deficiencies. It has been established that a prolonged drought or poor harvest season in a rural community can result in variable negative growth patterns of children [25].

There has been a concerted effort to improve the road to this community so that small vehicles can pass the rough terrain providing additional nutritional resources to children [26]. The researchers suggest this has increased availability and diversity of food which has had a positive impact on younger children as seen with a statistically significantly higher mean 'height-for-age' z-score when compared with older children.

2. Oworobong is the location of the only health clinic in the surrounding communities

In the village of Oworobong where a community health post opened in 2009 and the village Awiseasu that uses the same post as its initial health care facility, there was a statistically significant difference in the mean z-scores of 'height-for-age' between older and younger boys with the younger boys having less evidence of stunting. Chronic infections have been shown to negatively impact growth of children. Specifically, it has been shown that the interaction between infection and malnutrition is a key factor in the high mortality rates among children, especially those less than 5 years of age [27]. Simple health interventions such as hand washing with soap can decrease diarrhea and parasitic intestinal infections which can have long term growth consequences [28, 29, 30, 31]. This published research is consistent with the findings about boys within these two communities.

3. Oframase has a newly implemented school lunch program, where attendance in school is incentivized by providing government sponsored lunch to the children

In the village of Oframase, the mean z-score of 'BMI-for-age,' a marker for acute malnutrition, was significantly lower in older children than younger children. There has been an active intervention in this community with a newly implemented school lunch program. The aim of this

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government program is to ensure the availability of nutritional intake independent of home restrictions for all children who attend school. The program did not focus specifically on caloric intake but instead the availability of a wide variety of foods including carbohydrates, fats and oils, legumes and vegetables. The children who are now in the older age group did not have this early advantage. The data also demonstrated a positive trend in the growth of girls with younger girls demonstrating less evidence of stunting. Published research has revealed that school feeding programs not only increase school attendance, but also create economic stability in communities by increasing local agricultural production and local market development [32].

4. Miaso hosts a food market for the nearby communities twice a week

Miaso has a food market twice a week with a diverse food choice. The average annual household expenditure in Ghana is at GH¢1,918.00 (548.00USD), with food expenditure accounting for two-fifths of total household expenditure [33]. No significant difference in z-scores between age groups among boys for both 'height and BMI-for-age' was noted for Miaso. However, among girls, there was difference between age groups. Height-for-age was significantly lower in older girls in Miaso, indicating there has been a change from ages 5-9 and 10-12 years old in the availability of food with younger girls demonstrating improved growth parameters. The question of why these girls have features of chronic malnutrition in the presence of a market has yet to be evaluated. The impact of the market was not fully studied nor can it explain these results.

5. Asakraka has paved roads making it more easily accessible via vehicle

Asakraka is a community of commerce and economic stability that is the largest and most prosperous in the study area. It has a long standing health center nearby government hospital and it is the seat of the local chief. There is improved infrastructure with paved roads and a reliable source of water and electricity. The community has emphasized schooling for all the children including a library. Prior studies have shown that increased diversity of food is directly proportional to higher socioeconomic status leading to overall improved health [34]. This stability of the community extends to food resources which can be seen in the similar mean z-scores of 'height-for-age' and 'BMI-for-age' between older and younger children and the most positive mean for height-for-age when compared to the other villages. There is no significant difference between males and females. Since diversity in food choices has been shown to increase both macro and micronutrient intake, this could contribute to overall higher anthropometric measures when compared to the other communities [35].

6. Gender disparities

The data indicates there was a significant difference between the state of chronic malnutrition as measured by 'height-for-age' between younger (5-9 years old) and older (10-12 years old) children and between boys and girls. Specifically, in Awiseasu, Miaso and Oframase, the older girls had significantly lower height-for-age' z-scores signifying a chronic nutritional disadvantage during their growth. In Miaso and Oframase, there were no differences noted in boys of both age groups, implying that girls might have not received the nutritional support necessary either when they were younger, or are not receiving supplemental support as they age. Achieving food security where there is nutritious food in adequate quantities does not in itself confer proper nutrition. For example, inequitable distribution of food between genders within households is a concern [36].Women and girls also have the added disadvantage of being responsible for the preparation of foods which can include high caloric consumption activities like water or fuel collecting [37]. This can result in long- term sequelae such as stunting, a marker of chronic malnutrition as demonstrated by a 'height-for-age' z score < -2, which has been associated with decreased cognitive development and possible future economic productivity [38].

LIMITATIONS

Subject selection included only children who were attending school possibly causing a selection bias as not all children attend school in this region. Additionally, the lunch program in place in Oframase has only existed for approximately one year, and Oframase had conflicting results. Although still early in its implementation, older female subjects appear more acutely and chronically undernourished than younger females in this village which is a promising sign the school lunch program is working. It is important to note that the distribution of children enrolled in the study was not equal for every village including only one girl over the age of 10 years old who was interviewed in Asakraka.

Since this was not designed as a longitudinal study, coupled with a lack of available prior data in this region, it is difficult to place these results in proper context and prove the efficacy of the above interventions. Further research in this region is advised. Lastly, although used as a variable in the current study, all five villages were in the rural region of Kwahu-Eastern Region, Ghana.

CONCLUSION

Understanding the environmental influences on health and nutrition and their impact on negative growth parameters in target communities allows for site appropriate interventions. Children in rural isolated communities remain at risk of lower z-scores in 'height-for-age' and 'BMI-for-age'. Communities with a clinic, paved road and other resources do not demonstrate evidence of chronic malnutrition. Acute malnutrition as indicated by lower z-scores is demonstrated in older children of Oframase. Gender disparities are present. Recent interventions related to healthcare and nutritional initiatives have been implemented and need future studies to evaluate their efficacy.

RECOMMENDATIONS

The study advises ongoing monitoring, education and advocacy for nutritional surveillance for school-aged children in rural communities at a national level. Better understanding of the nutritional landscape of rural school-aged children allows for progress towards the eradication of extreme poverty and hunger. A follow up study in Oframase to investigate the growth parameters of girls and the efficacy of the school lunch program is recommended. This study did not formally document a dietary diversity score, but a 24 hour recall might demonstrate micronutrient deficiency for a more targeted intervention. Possible interventions targeting nutrition of girls through maternal education is recommended since domestic responsibilities are culturally done by women.

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The Rohde Foundation, Community leaders in Asakraka, Awiseasu, Miaso, Oframase, Oworobong, students and residents from the NYIT Center for Global Health Certificate program, David Guernsey, MPH are acknowledged for their support.

Table 1: Demographic data and nutrition characteristics of children in the study

Variable	
Age (Median years (Range))	9 (5 - 12)
Gender (N (%))	
Female	208 (50.6)
Male	203 (49.4)
Village (N (%))	
Asakraka	50 (12.2)
Awiseasu	50 (12.2)
Miaso	121 (29.4)
Oframase	70 (17.0)
Oworobong	120 (29.2)
Weight (Mean kg (SD))	23.2 (4.8)
Height (Mean cm (SD))	127.1 (10.1)
BMI (Mean kg/m2 (SD))	14.2 (1.3)
z-score of Weight-for-age (Mean (SD)) only for children of age 5-9	-1.31 (0.97)
z-score of Height-for-age (Mean (SD))	-1.03 (1.22)
z-score of BMI-for-age (Mean (SD))	-1.50 (0.96)

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Table 2: Comparison of mean z-scores of height-for-age and BMI-for-age between the groups of children of ages '5 – 9' and '10 – 12' Years (y) stratified by gender and village

				Height-for-age			BMI-for-age		
Village	**Gender**	**Age(y)**	**N**	**Mean**	**SD**	**p-value**	**Mean**	**SD**	**p-value**
Asakraka	M	5 - 9	19	-0.58	1.41	0.15	-1.23	0.87	0.50
		10 - 12	7	-1.44	0.94		-1.48	0.66	
		Total	26	-0.81	1.34		-1.30	0.82	
	F	5 - 9	23	-0.70	0.77	0.88	-1.44	0.77	0.39
		10 - 12	1	-0.58	0.00		-2.14	0.00	
		Total	24	-0.69	0.75		-1.47	0.76	
	B	5 - 9	42	-0.65	1.09	0.10	-1.35	0.81	0.49
		10 - 12	8	-1.33	0.92		-1.56	0.65	
		Total	50	-0.75	1.09		-1.38	0.79	
Awiseasu	M	5 - 9	10	-0.19	1.30	0.02	-1.52	0.86	0.13
		10 - 12	22	-1.43	0.67		-2.07	0.95	
		Total	32	-1.04	1.07		-1.90	0.95	
	F	5 - 9	9	-0.55	0.79	0.01	-2.04	0.73	0.69
		10 - 12	9	-1.54	0.68		-1.86	1.13	
		Total	18	-1.04	0.88		-1.95	0.93	
	B	5 - 9	19	-0.36	1.08	<0.001	-1.77	0.82	0.38
		10 - 12	31	-1.46	0.66		-2.01	0.99	
		Total	50	-1.04	0.99		-1.92	0.93	

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Miaso	M	5 - 9	28	-1.04	1.05	0.08	-1.28	1.03	0.04
		10 - 12	20	-1.53	0.66		-1.87	0.87	
		Total	48	-1.24	0.93		-1.52	1.00	
	F	5 - 9	32	-0.25	1.66	0.001	-1.44	0.82	0.79
		10 - 12	41	-1.40	0.85		-1.50	0.93	
		Total	73	-0.89	1.39		-1.47	0.88	
	B	5 - 9	60	-0.62	1.45	<0.001	-1.36	0.92	0.13
		10 - 12	61	-1.44	0.79		-1.62	0.92	
		Total	121	-1.03	1.23		-1.49	0.92	
Oframase	M	5 - 9	26	-1.23	1.09	0.07	-1.23	0.95	0.003
		10 - 12	11	-1.99	1.14		-2.57	1.57	
		Total	37	-1.46	1.14		-1.63	1.30	
	F	5 - 9	25	-0.53	1.16	<0.001	-1.37	0.90	<0.001
		10 - 12	8	-2.91	0.84		-3.01	1.24	
		Total	33	-1.11	1.49		-1.77	1.21	
	B	5 - 9	51	-0.89	1.17	<0.001	-1.30	0.92	<0.001
		10 - 12	19	-2.38	1.10		-2.76	1.42	
		Total	70	-1.29	1.32		-1.69	1.25	
Oworobong	M	5 - 9	41	-0.48	1.58	<0.001	-1.14	0.81	0.10
		10 - 12	19	-1.89	0.67		-1.49	0.62	
		Total	60	-0.92	1.51		-1.26	0.77	
	F	5 - 9	37	-0.83	0.99	0.08	-1.35	0.86	0.38
		10 - 12	23	-1.30	1.01		-1.16	0.75	
		Total	60	-1.01	1.01		-1.27	0.82	
	B	5 - 9	78	-0.64	1.34	<0.001	-1.24	0.84	0.66
		10 - 12	42	-1.56	0.91		-1.31	0.71	
		Total	120	-0.97	1.28		-1.26	0.79	

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Total	M	5 - 9	124	-0.76	1.35	<0.001	-1.24	0.90	<0.001
		10 - 12	79	-1.64	0.79		-1.90	1.00	
		Total	203	-1.10	1.24		-1.49	0.99	
	F	5 - 9	126	-0.58	1.19	<0.001	-1.44	0.84	0.27
		10 - 12	82	-1.52	0.98		-1.60	1.05	
		Total	208	-0.95	1.20		-1.50	0.93	
	B	5 - 9	250	-0.67	1.27	<0.001	-1.34	0.87	<0.001
		10 - 12	161	-1.58	0.89		-1.74	1.04	
		Total	411	-1.02	1.22		-1.50	0.96	

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