INTERNATIONAL POLICY BRIEF SERIES
Education and Science Journal of Policy Review and Curriculum Development
Volume 5 Number 1, May 2015.

THE DIETARY RIGHT OF CHILDREN AND ITS EFFECT ON PUPILS' PERFORMANCE IN MATHEMATICS IN RURAL GHANA; THE VOICES OF STAKEHOLDERS IN NAAGA TRADITIONAL AREA

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Abstract
Despite strengthening commitments from governments to provide quality education, a significant portion of pupils across rural Ghana still feed on poor diets. These diets seemed to effect negatively on pupils' performance in Mathematics in these areas. The purpose of this study was therefore, to explore the dietary right of children and its effect on pupils' performance in Mathematics. We randomly sampled one hundred stakeholders, comprising health workers, parents, teachers, pupils and orphans in the area. The MS Excel was used to produce descriptive charts and tables to analyze their responses. It was discovered that socio-cultural norms, poverty and ignorance attributed to the denial of the dietary rights of the pupils. These resulted in high incidence of deficiency diseases, absenteeism, truancy, low enrolments and drop-out rates. These subsequently had negative effects on the pupils' performance in Mathematics, which in turn, retarded the socio-economic growth and development of the rural Ghanaian economy, and the African economy as a whole. We therefore, recommended meal sensitization and new cultural paradigm shifts to improve upon performance in Mathematics in the rural schools.

Keywords: *Dietary right, Effect, Mathematics, Performance*

Background to the Study

The importance of a balanced diet in our daily life cannot be over-emphasized. This explains why many food promotion and producing agencies like the 'Live Aid', 'Operation Feed Your Self', 'Green Revolution', 'Back to the Land', 'Grow More Food', 'Help Age' and Food Agricultural Organization were established to increase food production and provision to cater for the vulnerable and children in every society. In Ghana, every first Friday of December is celebrated as 'Farmers' Day' just to motivate farmers and fishers to boost agriculture so that the people can prepare and eat balanced diets. These notwithstanding, many people still lack basic balanced diets in their meals. In rural Ghana, Naaga was a perfect example of this unfortunate scenario. This can be obtained from the health workers and the Navrongo Health Research Centre (NHRC) surveillances controls and treatment reports. They recorded a very high number of deficiency diseases. These included scurvy, rickets, kwashiorkor, beriberi, goiter, elephantiasis and marasmus. Other related diseases were measles, cholera and acute headaches. These

http://internationalpolicybrief.org/journals/edu-and-science-journal-vol5-no1
ISSN PRINT: 2315-8425, ONLINE 2354-1660

conditions occurred as results of either not eating enough food or eating poor diets.

Statement of the Problem

The issue of malnutrition was blamed squarely on the ignorance and socio-cultural norms etiquettes of the people of the area. Families were compelled to eat what they grew. However, the biggest casualties came from animal rearers. Even though these categories of people easily had access to meat and other animal products, it was still an abomination to kill animals just to prepare a balanced diet. The custom only allowed the consumption of meat sacrificed to the deities and gods or from dead animals. Even in most cases, women and children were not allowed to partake in the eating of these meat and animal products. While the girls were only kitchen helpers, the boys were not allowed to get nearer the kitchen. Boys who went close to the kitchen were considered homosexuals, a practice that had been highly frowned upon in that area. The devastating lives of orphans and children of single parents made the subject of balanced diet highly illusive.

Health workers recorded higher number of food deficiency related sicknesses among the children and observed the problem to emanate from dietary habits. Teachers also observed behaviours that were detrimental to the academic success of the pupils. Some of these border on attendance, class participation, low scores and indiscipline. These conditions had the negative effects of retarding pupils' performance in Mathematics. This is because the pupils' records books showed abysmally low scores in Mathematics in the teacher-made tests. We therefore conducted this study to advance evidence-based solutions of the dietary right to the development challenges affecting the rural child in Mathematics and its long run effect on the Ghanaian as well as the African economy.

Purpose of the Study

The purpose of this study is to advance the dietary right of children and its effect on pupils' performance in Mathematics in rural Ghana.

Objectives of the Study

The objectives are:

1. To sensitize stakeholders on the dietary right of children to instill balanced diet preparation and consumption as a basic *human right issue* to promote growth and development.
2. To recommend ways of promoting dietary right of children to boost performance in Mathematics for sustainable development of the country.

Research Question

How can we sensitize stakeholders on thedietary right of children to promote balanced diet preparation and consumption as a basic *human right issue* to promote growth and development?

Methodology

Letters clearly explaining the objectives and research protocol were distributed to the health workers, parents, teachers and pupils. Included in the letters were written informed consent and an assent form were obtained from all stakeholders before the start of the data collection. The department and centre of the authors were consulted to grant the ethical approval for this study. Permission to conduct the research in the selected schools was also obtained from the Ghana Education (schools) and the Service Ghana Health Service (clinic).

The researchers used a variety observation guides, interview guides and questionnaires appropriate to the different segments of the people. This is because some of the respondents could read and write well, for which one tool could not effectively have been utilized. More so, some respondents were children, most of whom were poor, needy, orphans and shepherds, and unable to read and write. A total of twenty items was developed and distributed to about one hundred respondents, comprising health workers,

teachers, parents and pupils. The sample comprised 20 teachers, 10 health workers, 30 parents, 20 school pupils and 20 orphans. The data was recorded at homes, at schools, at the clinic and in the market centres. The MS Excel tool was explored to generate descriptive tables and charts for the data analysis.

The Concept of Malnutrition

Janson (2014) explains malnutrition as the state of being poorly nourished. This condition is not just merely of too little food, but also of a combination of insufficient micronutrients. Other related conditions to poor diets are frequent diseases, poor feeding practices, inadequate health services, unsafe water and poor sanitary environments. All these conditions could hamper the dietary rights of children physically, mentally and emotionally.

Research works (Janson, 2014; Sabates et al. 2010; Acham et al., 2008; Averett, and Stifel, 2006; Filmer, Hasanand Pritchett, 2006) show that globally, more than one-third of under-five deaths are associated with under-nutrition, and 165 million are stunted in height due to chronic illness and poor diets. In all Sub-Saharan Africa except Kenya, there is a significant number of 16 and 17 year-old pupils who dropped out of the primary school because of food. Reports particularly established that in Ghana, only a quarter of 15-19 year-old pupils could answer more than half of very simple mathematics questions. This situation seems to be worst in the rural areas.

There is therefore sufficient evidence to show that malnutrition cripples children's growth, render them susceptible to diseases, breeds dull intellects, diminishes motivation and retards their physical development. There is also a strong link between nutrition and brain function, learning capability and behaviour. These evidences eventually negatively effect on the performance of Mathematics. The long run negative effects are academic under-achievement and economic retrogression in Ghanaian as well as the Africa economy. We therefore explored more information from the stakeholders in Naaga to enable us advance evidence-based solutions to the development challenges affecting the African economy.

The Voices of Health Workers about Diets and Mathematics Performance

Studies with health workers generally found that children who had suffered from early malnutrition had poorer Intelligence Quotient (IQ) levels, cognitive function, under-achievement and behavioural problems. Particularly, it has been established that between the child variables (gender, age, low birth weight and history of previous hospitalizations), and the caregiver variables (age, birth, education, employment, and depressive symptoms), the caregivers in food-insecure households were two-thirds more likely than caregivers in food-secure households to report that their children were at developmental risk.

Health workers also have voices on body mass index (BMI). BMI is the main standard for measuring child nutritional outcomes. It is simply the ratio of the weight (in kilograms, kg) to the height (in meters squared, m^2). Thus, a child is considered likely to be overweight if his/her BMI for age is over the 95th percentile of the healthy reference population, while he/she is considered likely to be at risk for overweight with a BMI for age above the 85th percentile. Children classified as likely to be underweight are those with BMI for age measures less than the fifth percentile (Janson, 2014; Prado and Dewey, 2012; Food and Nutrition Information Center, 2011; Townley, 2009; Sorhaindo and Feinstein, 2006). Health workers bemoaned abysmally low BMI ratios among the children of Naaga, and observed the canker to emanate from ignorance.

The Voices of Parents and Guardians about Diets and Mathematics Performance

Naaga is located at the North of West Mamprusi District of the Northern Region, South of Navrongo in the Kasena-Nankana East Municipality, East of Kadema in the Builsa Districts and West of Bolga-Sherigu in the Bolgatanga Municipality, all of the Upper East

Region of Ghana. The village is largely surrounded by rivers and streams, and its major occupations being agriculture and fishing. One would expect such a place to produce and eat all manner of meals. However, parents observed that there were restricted to eating only the crops that they cultivate or eat the meat or fish that they get.

Also, the low profile location of the village negatively effect on pupils' performance. Kemunto, (2012), Adrogué and Orlicki (2010), Hassan (2009), Rammala (2009) and The International Academy of Education (2008) show that home problems (environments, social amenities and natural resources), pupils' self-esteem and parental status (educational level, marital, communication and employment) determine good parents. In particular, the area, household size, family attitudes and distance to and from school determine the academic performance in Mathematics. Most parents in the village fall prey to these negative attributes which brought to bear in the poor performance in Mathematics.

The Voices of Teachers about Diets and Mathematics Performance

Research from teachers show that good dietary habits increase learners' profile motivates and develops positive attitude towards learning. Reports indicate that there has been progress in improving school participation since the 1990 World Conference on Education for All in Jomtien, even though large inequalities in drop-out rates still exists according to wealth, gender and locations. The studies established lower proportions of 16 and 17 year-old pupils from the richest quintile of the wealth distribution dropped out of primary schools and higher proportions from the poorest quintile (Food and Nutrition Information Center, 2011; Adrogué and Orlicki, 2010; Sabates, Akyeampong, Westbrook and Hunt, 2010; Rammala, 2009). Teachers of Naaga experience such inequalities of performance among children and orphans, especially in Mathematics.

The Voices of Pupils about Diets and Mathematics Performance

Research on pupils show, that in developing countries, widespread absolute poverty hampers pupils' education. Some of the factors are poor diets, poor health facilities, limited funding and unconducive homes. Particularly, good diets have positive effects on enrollment, school attendance, school dropout, child learning and brain development (Kemunto, 2012; Rammala, 2009; Luo et al., 2010; Kikafunda1 et al., 2008; The International Academy of Education, 2008;Ahmed, 2004).

Luo et al., (2010) particularly discovered that the standardized Mathematics test scores of students who received the multivitamin with mineral supplements improved significantly. Luo et al (2010) concluded that the reductions in anemia rates and improvements in the test scores were attributed to the rich balanced diets prepared for those students. There is therefore, the need for school teachers to design diets for pupils who wish to study Mathematics and its related careers.

RESULTS AND ANALYSES

Findings from health workers

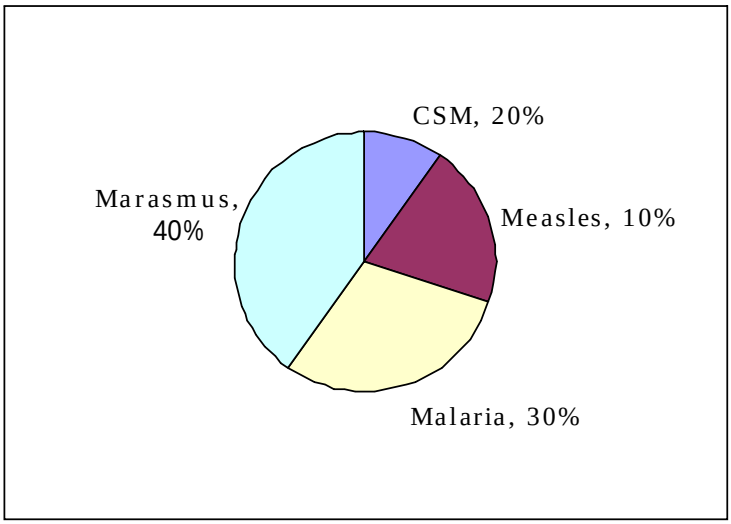

Figure 1: A pie chart of the most prevalent diseases in Naaga

The pie chart on figure 1 above captures the responses of health workers on which diseases were most prevalent in the area. It was emphatically clear that the 10 health workers affirmed marasmus (40%) because many people were either poor or ignorant of food preparation. Following maramus were malaria (30%), Celebro-Spinal Meningitis (CSM-20%) and measles (10%). They even linked the other diseases to poor eating habits (marasmus).

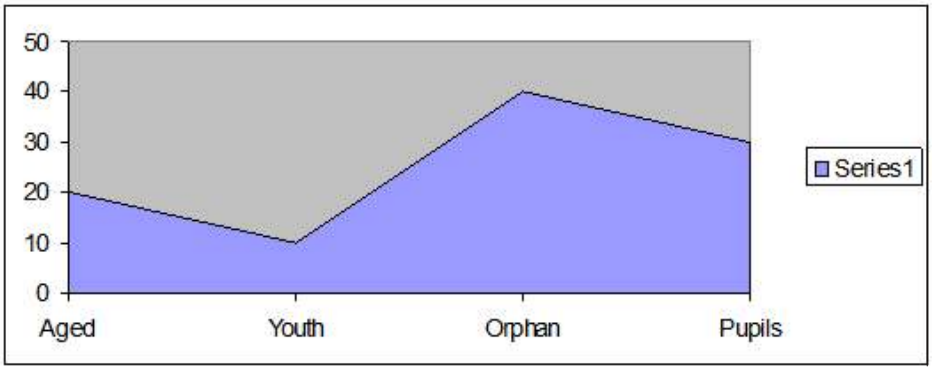

Figure 2: An area chart of people with highest incidence of diseases in Naaga

The area chart in figure 2 above shows the people with highest incidence of diseases in Naaga. It was very clear that orphans recorded the highest number of people who suffered most with diseases. This was closely followed by school pupils, the aged and then the youth in that decreasing order. The health workers attested that while the orphans inadequate feeding, the pupils were simply malnourished. Either case had detrimental effects on the general teaching and learning, and the performance of Mathematics in particular.

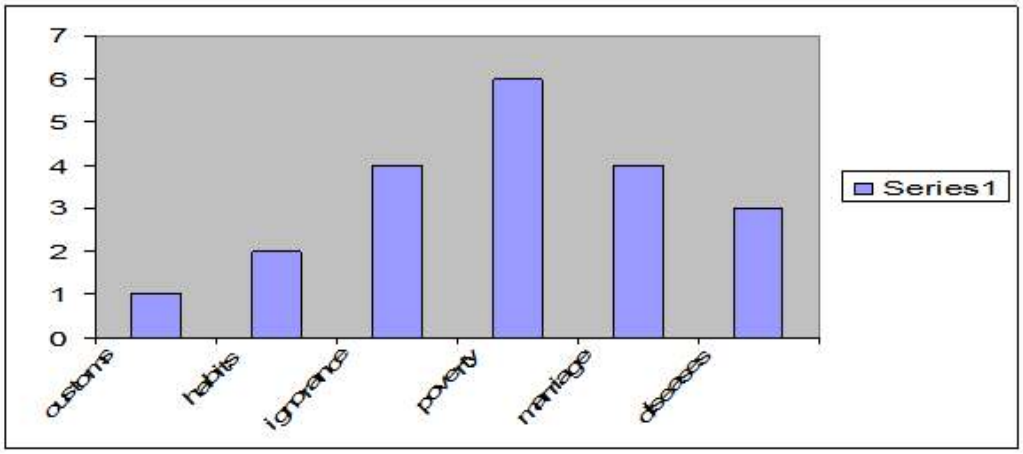

Figure 3: A bar chart of the causes of malnutrition in Naaga

The pie chart on figure 3 above shows the causes of malnutrition in the village. The health workers rated the causes as poverty, ignorance, marriage style, disasters, feeding habits and traditional customary practices. Therefore, poverty was the major cause of malnutrition because of poor farming methods, illiteracy, bad climate and outmoded cultural practices. All theses causes had negative impacts on the performance in Mathematics, the total development of a nation and the growth continent as a whole.

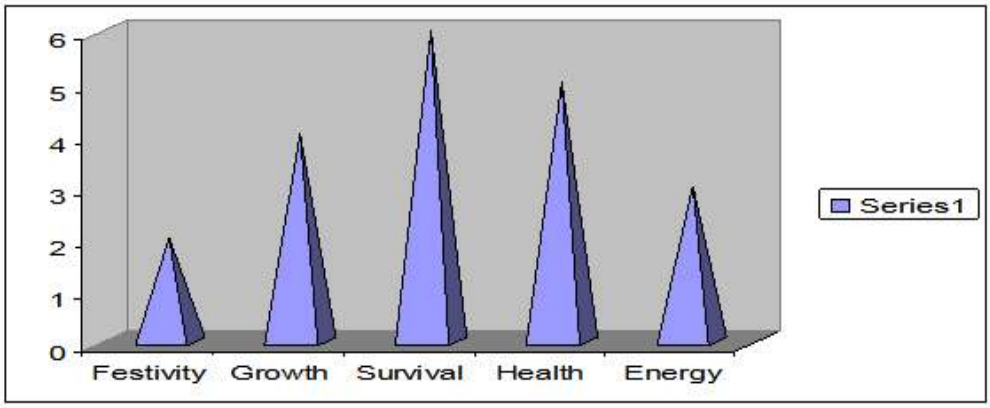

Figure 4: A pyramid chart of the reasons pupils eat food everyday

The pyramids chart on figure 4 shows the reasons why the pupils ate food in a day. The findings showed pupils largely eat food to survive, to gain good health and to grow well. The others were to get enough energy and to feast during festive occasions. One could deduce survival was more than any one of the other reasons. That notwithstanding, the other reasons were still very essential to the higher educational attainment and excellent performance in Mathematics.

Findings from Teachers

Table 1: A table showing pupils who were observed being hungry in school

Response	*Number of respondents*	*Percentage of respondents*
Yes	19	90%
No	1	10%
Total	20	100%

The table 1 above shows the 20 teachers who responded as to whether they observed pupils hungry in early mornings. The findings showed that about 90% of the teachers observed this negative phenomenon in pupils in school. When these teachers were quizzed further to assign possible reasons to the problem, they also alluded to lack of the parental care, broken homes, cultural norms and ignorance of balanced food preparations.

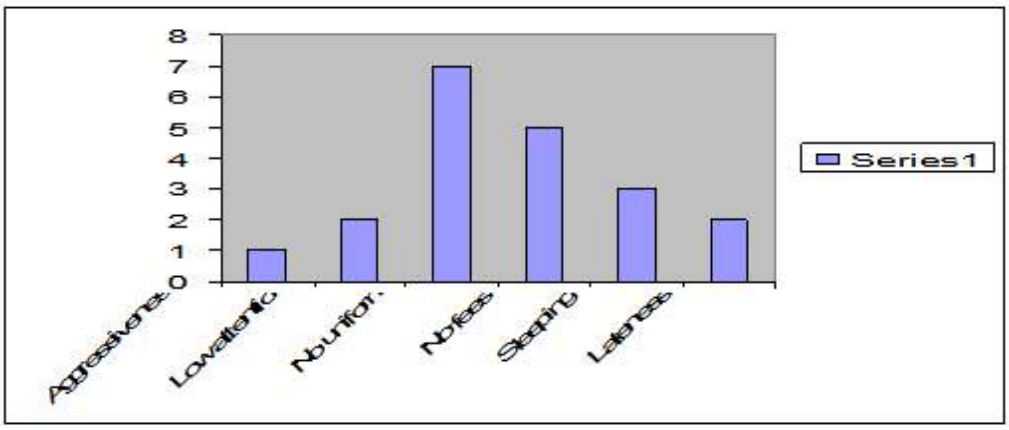

Figure 5: A bar chart showing behaviours of hungry pupils in school

The bar chart on figure 5 above shows the various behaviours pupils exhibit in school when they are hungry. The most visible sign the teachers observed was sluggish dressing and followed by non-payment of fees. The other effects were sleeping in class (15%), lateness to school (10%) and low attention in class (10%) and aggressive bahaviours (5%). They mostly wear dirty and shabby clothes to school and most often cannot pay their fees. These two major symptoms breed low self-esteem, lack of motivation, active participation and self actualization. The factors breed dullness, laziness and low performance. All these symptoms cause poor academic attainments and low performance in Mathematics.

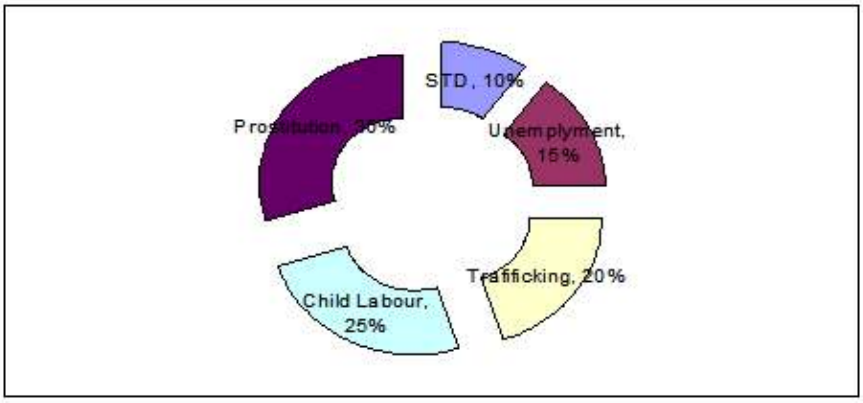

Figure 6: A doughnut chart of effects of child drop out

The doughnut chart on figure 6 above shows the problems pupils are likely to encounter if they drop-out of school. It was observed that the commonest cankers were prostitution (30%), child labour (25%0 and child trafficking (20%). The rest were unemployment (15%) and being infected with Sexually Transmitted Diseases (STDs-10%). The findings strongly indicated that the future of the pupils may be worsened with sexually transmitted diseases (STDs), may not get reliable source of income to earn a decent living, may resort to drug trafficking, may have to work earlier than their normal ages and may follow adults for money to make living. None of these problems can ever ameliorate personal and national development.

Findings from Parents

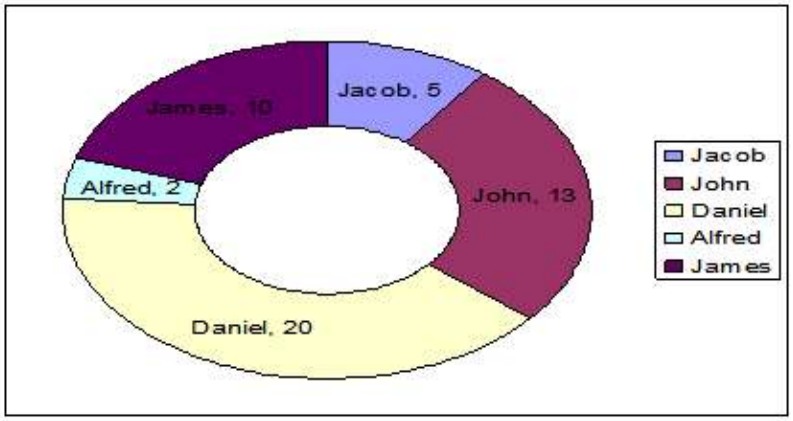

Figure 7: A doughnut chart of five men and their family sizes

The doughnut chart on figure 7 shows a section of only five men and their family sizes. The figures suggest that apart from Alfred who took care of a small family of two, the rest had family sizes ranging from 5 (Jacob) to 20 people (Daniel). There is no doubt that people living and catering for large family sizes cannot adequately take care of their wards in school. The issue of large family sizes emanates from socio-cultural factors of early marriage, polygamy, family labour and prestige. Even the rare case of Alfred with that small family size might have been unmarried, divorced or separated. The issue of large family sizes partly explains why parents cannot prepare well balanced diets for their children. These definitely breed its ugly head in the educational attainment and in the performance of pupils in Mathematics.

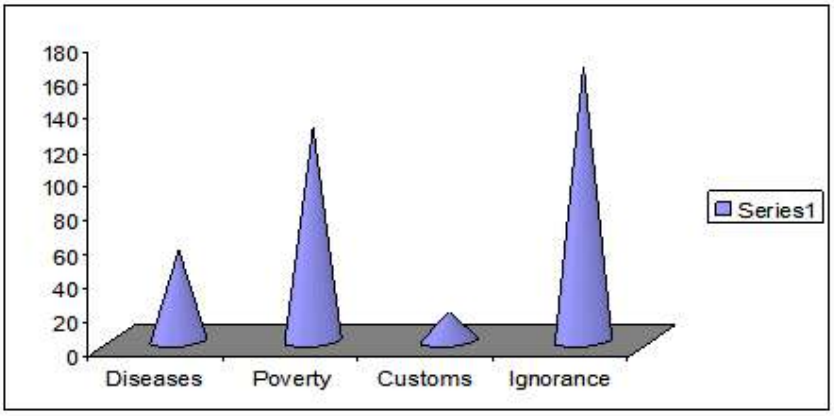

Figure 8: A cone chart of reasons people fail to prepare balanced diets

The cone chart on figure 8 above shows the reasons why majority of the 30 parents cannot prepare balanced diets for their families. The findings showed that ignorance (162°), poverty (126°), natural disasters (54°) and customary practices (18°) were the main inhibiting factors militating against taking balanced diets. There is therefore, no doubt that the reasons retard educational and performance in Mathematics.

Findings arom Pupils (Including Orphans)

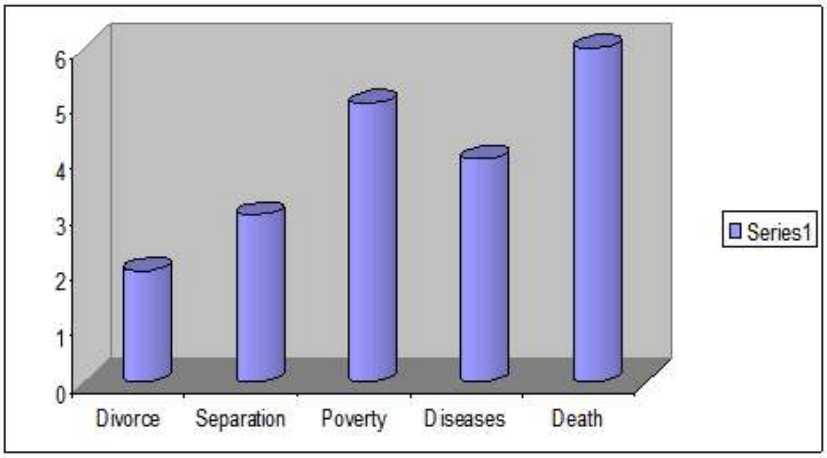

Figure 9: A cylinder chart of reasons pupils do not get food to eat

A cylinder chart on figure 9 above shows the reasons why some pupils do not have food to eat in the rural. The major reasons were death of parents (30%), poor parents (25%), sick parents (20%), separated parents (15%) and divorced parents (10%). All these reasons have the ability to retard the pupils' academic progress in learning to become useful citizens in future. All categories of pupils of these parents cannot get food at all, not to talk of eating balanced diets. It was therefore, incumbent to observe pupils of such backgrounds feeling hungry, paying little attention in class and performing poorly in Mathematics.

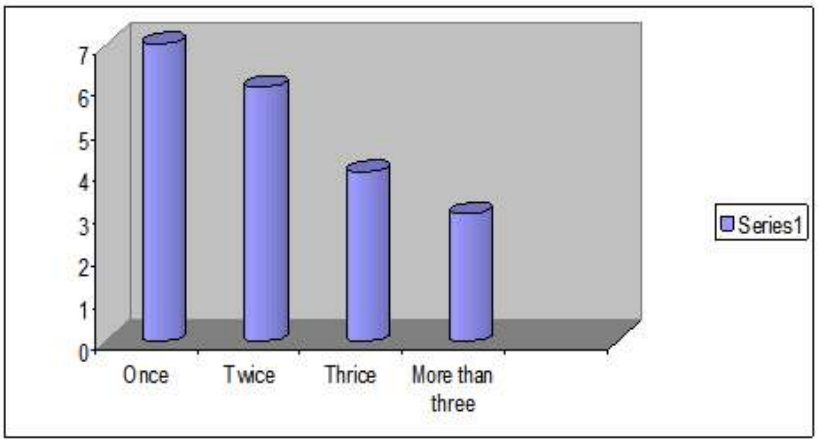

Figure 10: A cone chart showing the number of times pupils eat in a day

The cylinder chart on figure 10 about shows the number of times the 20 orphans got food to eat in a day. There were as many as 7 of them who ate once in a day and only 3 pupils got three square meals in a day. These findings showed the aggravating magnitude of inadequate food supply in this rural area. This clear case of under-nutrition would definitely affect education and performance in Mathematics.

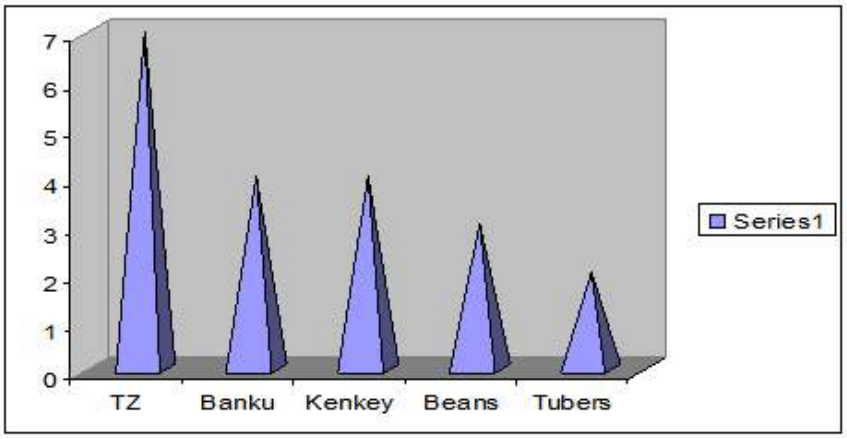

Figure 11: A pyramid chart of the kind of food pupils eat most

The pyramid chart in figure 11 above shows the type of meals the 20 school pupils eat most in the village. There were about 7 pupils who ate TZ, 4 pupils ate Banku, 4 pupils ate Kenkey, 3 pupils ate Beans and only 2 pupils ate Tubers a day. The findings showed that most ate carbohydrates meals as compared to proteins and vitamins. This explains why the health workers enumerated several food deficiency diseases suffered by the pupils of this rural area. The problem of malnutrition must be tackled with the seriousness it deserves to ensure high performance in Mathematics.

Conclusion

The findings from the health workers, parents, pupils and teachers attributed the poor performance of pupils in Mathematics in the rural Naaga area to malnutrition. This has been caused by outmoded cultural practices and ignorance of food preparations. These manifested in the deficiency diseases and their related problems.

Recommendations

We therefore, suggested the following measures to ameliorate the canker.

1. Health and sanitation education should be organized regularly. Such programmes should focus more on the nutritional values of foods, proper cooking methods, food preservation methods and malnutrition to curtail dietary diseases.
2. Parents and their Families should create the atmosphere necessary for peaceful coexistence, and inculcate into their children the rights of their love, care, security, education and protection. These would ensure self-confidence and self-esteem and promote healthy living.
3. Clan and family heads should also revise the outmoded ancestral and cultural practices of polygamy, early marriages, widowhood rites and many other rites of passages that have the potentials of creating food insufficiency and frequent shortages in the rural areas.
4. Government should intensify its efforts to construct feeder roads, build silos and bridges / culverts to make rural transportation easier so that people can buy and sell from nearby communities.

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