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The Effect of Nutrition on Children's Performance in Number Work Activity in Moiben Constituency, Uasin Gishu County, Kenya

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Abstract:

The school nutritional programme is popular in Kenya. It is an important instrument for improving the nutritional needs of the pre-school children in line with the Millennium Development Goals and Education for All. The study sought to determine the effect of nutrition on performance of children in number work activities in pre-schools in Moiben Constituency Uasin Gishu County. Based on the study, this paper examines the effect of nutrition on children's performance in number work activity in Moiben Constituency. This study employed a quasi-experimental research design with both qualitative and quantitative design. The sample size comprised 6 head teachers, 18 teachers 60 pre-school parents and 180 children of public pre-schools from Moiben Constituency. The primary data were collected by way of questionnaires and interviews. Questionnaires were administered to teachers who filled them appropriately. Interview schedules were organised for the head teachers and the parents who were interviewed during pick up times. The schools used in the study were categorised as the experimental and non-experimental schools. The teachers who were all qualified in both categories of schools were given a topic on number work activity to teach the children over a period of three weeks. A specially designed number work test was set and administered to the pupils. Quantitative data was analysed using descriptive statistics with the aid of the Statistical Package for Social Sciences (SPSS). The study established that the main types of food given to the children were: porridge, boiled maize and beans and vegetables. It was found out that the provision of nutrition programme improved the overall performance of the children in number work. The parents attested that school nutrition programme effectively improved performance of the children in number work, of which 100% of the parents agreed that indeed school nutrition programme improved number work. The study concluded that the school feeding programme had helped to improve the performance of the pupils in number work as a result of daily attendance of school by children. The study recommended that the school feeding programmes be implemented in all schools in Moiben Constituency.

Keywords: Effect, Nutrition, Children, Performance, Number Work Activity, Moiben, Uasin Gishu, Kenya

1. Introduction

School feeding programmes date back to the 1930s in the United Kingdom and United States of America (Tomlison, 2007). These countries later instituted the feeding programmes as part of their national programmes with the main aim of improving children's growth. The United States started the school feeding programme in Austria as international aid, its aim being to combat severe malnutrition in the 1940s.

In developing countries, many children are malnourished in their early years as a result of poverty. In these countries approximately 60 million children go to school hungry, with almost 40% of them in Africa. Malnutrition affects the development of all the human tissue adversely. Its effects are also adverse on brain development which is well known to the medical profession for a number of decades now. The capacity of a child to adapt himself/herself to changing environment and circumstances from home to school and the cognitive function of the brain are for example, two areas where malnutrition in a young child leaves its ill effects and makes him/her specifically ill equipped for progress in schooling. Lack of adequate nutrients in early childhood is unfortunately quite common among the children of the poor.

Development activities that target children are tools for eradicating chronic hunger and lifting developing countries out of the poverty trap. Since the late 1970s, the government of Kenya has undertaken the initiative to improve children health, nutrition and school participation. The national School Milk Programme was established through a Presidential Directive in 1979. It was designed to supply milk to all primary schools. Every year, the National School Feeding Council (NSFCK) is provided with grants from the government of Kenya to supplement the funds from other non-governmental individuals and organizations (MoE, 1987).

The Government of Kenya and the World Food Programme, school feeding programme was designed to increase school enrolment, retention and completion through provision of school meals. Recently, the NSFCK revised its policy on the provision of school feeding programmes. It stated that school feeding programmes, other than being provided to the children in need in areas where parents can afford to maintain the feeding programmes, should be encouraged. This programme is currently under the Director of the NSFCK with funding support from parents, donations from individuals and other organizations and minimal grants from NSFCK. It relies on the school communities headed by the school head teacher, members of the feeding staff and the school management committee (SMC) and food commodities are bought from the local market.

The main objectives of these school feeding activities are to give and provide food supplements to both the pre-primary and primary school children. These supplements are meant to help improve their health and nutritional status and provide them the energy to participate in school particularly in food-deficit and semi-arid areas of the country. To achieve sustainable economic growth and human development, a country must invest heavily in building its human capital from the younger generations. One way to do this is by investing in nutrition of the school aged children.

1.1. Effects of Nutrition on Children's Performance in Number Work

Alabi (2003) asserts that many studies done on nutrition have shown that under nutrition leads to children's stunting and mental development which shows the relationship between nutrition and academic performance. Students who have access to feeding programmes often have the ability to perform well and regularly attend school (Yunusa, Gumel & Adegbusi, 2012).

The extent to which a child has achieved their educational goals is known as academic achievement or (academic) performance which is also the outcome of education. Different methods are used to measure children's academic performance. These include standardized achievement test scores, report card grades and, especially, teacher ratings of number work activities performance. Sattler (2001) described the standardized achievement tests as impartial tools for evaluating the knowledge level and skills of pupils by use of academic output measures of every subject. These measures include reading and comprehension, problem solving in math, writing, among others. In every subject, teachers use standard criteria to rate pupils' performance on all areas of learning. As such, standardized achievement tests are a reliable way of gauging actual achievement levels of every pupil. On the other hand, report cards are useful when instructors want to assess classroom learning. However, since they do not have a standardized grading system, these cards are hardly used in measuring the performance of early childhood learners (DuPaul & Rapport, 1991).

Proper feeding and nutrition starts during pregnancy. The expectant mother has to eat meals that have sufficient protein, fresh fruits, carbohydrates and vegetables to supply the body with proper nourishment for both her and the foetus. A study by Otieno (2014) has found that early observance of nutrition enhances the development of the brain and its functions and enhances the growth of breathing and blood circulation system in children.

Anyango (2012) has found that a child's first environment influences intelligence and language. Across social classes or in different children's homes, Aspects of family interactions can be directly linked to different in measured intelligence. A balanced diet is a critical contributor to a child's growth and development before and even during their schooling life. The education of parents, the income of the family, the child's caretaking arrangements, the health and dietary intake are part of factors that determine in part the child's schooling and performance. When proper nutrition is observed at this early age we are sure to have a healthy nation in the days to come.

A balanced diet is not a meal that costs more, but one that has all the nutrients needed by the body. Not all meals can have all these nutrients; however, it is important to ensure that at the end of the day, a child has consumed the right proportions of all the necessary nutrients to grow in health. Most of the nourishing foods are less expensive and usually are high calorie foods. The effect of nutrition to learning development is influenced by traditional food taboos, workload, and modern influence, just to mention but a few.

Research on children attending school, which have investigated on the relationship between health, nutrition and school performance in number work show that well-nourished and healthy children often perform better academically than their peers who are sick and poorly nourished (Nikinyingi, 1988). Another study indicated that nutritionally well-nourished children have better attention span, concentration and scored significantly higher on mental ability test (Pollit, 1984). A similar study compared well-nourished and poor nourished on Mental Development Index (MDI), the well-nourished children performed much better than poorly nourished (Pollit, 1998).

When a child's diet is healthy, concentration increases and enthusiasm in learning together with participation and love for learning (Powel, 1978-1983). Powel emphasized that, nutritional characteristics of meals provided in school or classroom setting do not meet nutritional needs of children. However, there are variables associated with both recipients and the institution which are likely to interact with nutritional programmes and they determine its outcome (Pollit, 1984). According to the KIE(1990), feeding has an effect on the development of the brain and body, without proper feeding children's brain cannot develop to the maximum.

The psychology of children is affected by proper nutrition. Children usually associate food they eat with love, acceptance, happy family and environment. Thus, a child develops confidence that helps him/her to learn better. This good psychology input from food allows children to do things calmly and without worry (Powel, 1978-1983). During the first years of life having meals that contain all the necessary nutrients increases the potential for good performance and having a

successful life. According to Magers (1985), the nutritional quality of food also impacts the unique development of every child, ranging from the growth of their intellectual faculties, emotive growth, ability to communicate, to the general body adaptability to the environment.

Food can help a child face daily school problem with strength and confidence. Lack of correct food makes a child irritable, stressful and unable to concentrate, difficult to teach as teachers attest to the fact that their attention span and school performance is greatly affected and they are also easily affected by a variety of germs and infections. Children who have the right dose of balanced diet every day are able to exploit their optimal abilities to learn, to sustain their concentration for longer durations, and engage in all health-promoting activities of the day. These are the physical indicators of a well-nourished child.

Dr. Van VanVynckt gives an overview on the present state of knowledge about nutrition and health conditions on learning and school participation. she states that over the years researchers from different countries have documented on the association between nutrition, health and children's school participation. These are all important in the grow and development of the child. A recent UNESCO scientific review qualifies some of the adverse educational consequences of all health and malnutrition (Pollit, 1984). It can be inferred from these UNESCO analyses that common nutrition and health conditions may play a role in determining a child readiness to attend school regularly, learn and progress in school. The nutritional quality of the food that children consume has a lasting impact over the rest of their lives. The physical and psychological excitement or motivation or disposition of a child to enrolling and continuously attending school is dependent on their sense of physical energy and mental preparedness, which are factors of growth and nutrition. Malnourished children can hardly persevere the pressures of school life. Therefore, proper nutrition at an early age gives the child a sense of psychological security for their physical needs, which enables them to concentrate in school.

Many studies have found a direct link between nutrition and children's educational behaviours. Constant sickness, as a factor of poor nutrition, has been found to have a direct link with academic performance in Kenya. Children who are affected by these problems tend to take time before joining school. They also register a higher drop-out rates compared to their well-nourished counterparts. The reverse is also true, that good quality diets enhance children's ability and attitudes towards learning. Indeed, Crawford (1990), in numerous studies on nutrition and cognitive development, concludes that malnourishment has a lasting effect on a child's initial brain growth and functioning.

Malnutrition implies insufficient food intake by quantity (joules or calories) or quality (proteins and carbohydrates) (Kokul, 1991). It is a result of the lack of the right amounts of the required macronutrients in the food. Granted that there are many causes of ill health, but food is the mainstay of preventive healthcare. To add to adequate intake of energy calories each day, individuals need to be disease free (Kokul, 1991).

Studies carried out in Central America and India to assess the full impact of malnutrition of human intelligence and on the functional capacity of the brain show that children who were severely malnourished are often miserable, pathetic, irritable, disinterested in the surroundings and show many other signs of poor mental ability. Their performance in school may be very much affected. According to Stock and Snythe (1963), children aged between two and five years undergo a heightened level of brain development. Interestingly, this category of children also happens to comprise the majority of those enrolled in ECDE. Indeed, in their study, these authors established that poorly nourished ECDE learners have a skull capacity 14% lower and IQ of 15 points less than those of their well-nourished colleagues.

Bemette (2013) posits that poor nutrition is a major contributor to child morbidity in transitional societies. The WHO (1988) also associates the increased frequency and length of sickness with poor nutrition. Malnutrition is truly an undesirable kind of nutrition leading to ill health. It is endemic and it is particularly prevalent among the low-income segments of population. Malnutrition impairs the mental development, lower brain cellularity, lowers child's motivation, energy levels and thus reduces quantity of effective learning (Lloyd-Still, 1979). Such characteristics make the child particularly vulnerable to poor growth and exposure to illness. Low access to good diet and constant ill health at pre-school exacerbate early onset of malnutrition (Pollit, 1998).

The government of Kenya has a clear vision for improving nutrition among the citizens as documented in Vision 2030. The Government also approved a National Nutrition Action Plan in November 2012. However, the country's ongoing process of decentralization of government functions including early childhood education has not incorporated measures to improve nutrition among pre-schoolers despite knowledge that nutrition at preschool level influences learners' performance both in preschool years and later in life. Number work in pre-school children lays the foundation of concepts and skills where future learning and operations are built on.

Education plays a key role in national development since it produces a work force that steers national growth. The key subjects that are usually emphasized from early childhood classes include number work, which is usually referred to as mathematics in upper classes. It is a subject considered core for admission to training in tertiary institutions in the country. Therefore, its performance should be emphasized from as early as preschool level. Performance in number work or mathematics in upper classes has always been a concern in many schools across the country. Measures have been taken to improve its performance among children with varying degrees of success. Children who had iron deficiency tended to register marks to the tune of almost half the average scores in numbers examinations, and the situation was worse among girls than boys. This is according to a research done in the United States (Haltermann, Kaczorowski, Aligne, Auinger & Szilagyi, 2001).

Studies have been done in many countries on various variables affecting number work at ECD level of education. Research done in Minnesota, (USA), showed that nutrition affects children's health, behaviour and thinking skills thereby affecting number work performance. Nutritional deficiencies during the early years of life can affect cognitive development hence learning of number work from as early as ECD level of education. A study by Bellisle (2004) indicated that nutrition improves concentration, cognition and energy levels improving their ability to understand number work concepts are better.

In Kenya, most of the studies on nutrition at ECD level have focused on the school feeding programme. However, a wide gap still exists on how nutrition provided affects performance in number work. This study will give information to bridge the knowledge gap for ECD schools with Eldoret town environs.

1.2. Statement of the Problem

Nutrition is an important element in children's growth and development which includes physical, emotional and cognitive development. Food is an essential component of life; it is the primary source of health, energy, growth and development from childhood to adulthood (Omago, 1990). In Kenya, pre-schools are yet to realize the vitality of good quality and quantity of food in the life of young learners (Ngong'a, 2014). Most of these schools receive children from disadvantaged households within. These children have no guarantee of daily meals due to their poor socio-economic background. Balanced diet is necessary because it builds, protects and repairs the body. Human beings require sufficient food for sustainability and functionality. The problem of malnutrition and its effects on brain development, physical and intellectual functioning has tremendous implications.

This study has been developed to address the problem of poor performance in number work among preschool children in selected schools in Uasin Gishu County. There could be many causes but this study will investigate the effect of nutrition on performance in number work activity. Nutrition is a major factor that affects a child's development. Children who are well fed become healthier and tend to achieve more in class than those who are underfed. Malnourished children suffer from diseases and have more problems fighting infections, which prevent them from attending school (UNESCO, 1999). Childhood underweight due to malnutrition is internationally recognized as an important public health problem and its devastating effects on human performance, health, and survival are well established. Therefore, schools should provide meals or parents ensure their children get necessary food to ensure good learning among children (UNESCO, 1999). However, not many preschools in Kenya have meals since information generated through research to back up such programs is scanty.

Pre-schools in Uasin Gishu are categorized as private and public. Some of the schools have centrally organized meals in schools while others do not at all. The preschool children are trained similarly and the graduates compete for the same schools in the region for class one admission. Due to the financial difficulties, some parents are unable to pay for school meals therefore withdrawing their children from such schools, while others opt to pack lunch for their children. Such children do not get proper nutrition or a diet that varies from one family to another. Children in the county come from families of different socioeconomic status, which could be a source of variability in cognitive development hence learning process at preschool level. Therefore, it is necessary to establish how nutrition affects performance in number work in preschool children in Uasin Gishu County, which becomes the criteria for making informed decisions during selection of children for primary education. Several studies done in Kenya have focused on other variables that affect nutritional status of pre-schoolers age 5 and below (Murungi, 2012; Mwaniki & Makokha, 2013; Apondi, 2014), but not the effect of nutrition on children's performance in number work activities in pre-school children, therefore this became the focus of this study.

2. Methodology

The study adopted a quasi-experimental research design with a mix of qualitative data. The schools that provided meals were categorized as experimental while those that did not provide food were the control group. Both groups of schools were given a topic by the researcher. The teachers taught the children over a period of three weeks and later a test which was set by the teachers then moderated by the researcher given to the children. The results were computed using the t-test. In addition to the quasi-experimental design, the study will use qualitative technique to obtain data from parents.

The study targeted head teachers, teachers and parents of the ECD respondents. The target population for the study comprised 6 preschools, 180 pre-school children, 18 teachers, 6 head teachers and 60 parents of the schools involved. Moiben Constituency had 35 pre-schools at the time of the study. Purposive sampling method was used to select the schools. Random sampling was used to obtain a sample of the 60 parents whose children were enrolled in both categories of the schools selected. The research instruments used for data collection included questionnaires, interview schedules and tests. Data obtained from the field through questionnaires was coded. The mean scores, standard deviations, were computed using SPSS software to enable the researcher to compare performance of the two groups of pre-schools. Data from the questionnaires was analysed and tabulated using percentages while that from interviews was analysed thematically.

3. Results and Discussion

3.1. Effect of Nutrition on Children's Performance in Number Work Activity

The study sought to determine the effect of nutrition on children's performance in number work activity in Moiben Constituency. Information on the presence of the school nutrition programme was the first sought from the head teachers.

Among the six sampled schools, 4(67%) offered school nutrition programme while the remaining 2(33.3%) did not offer any school nutrition programme.

Information on those who financed the school nutrition programme is shown in Table 1. Based on the table, one quarter of the schools were financed each by parents, another quarter by the school, another quarter by school and NGO and the last quarter of the schools financed by parents and school. This implies that school nutrition programme is not an exclusive programme left to the school alone but there are also other stakeholders who are involved in financing the programme including the NGOs and parents who take their children to the schools. The head teachers attested to the fact that running the school feeding programmes was an uphill task since the county governments does not provide funds for the meals even though they are allocated funds for the programme.

The NGOs providing the school feeding programmes on the commencement of the programme provided fuel used to cook food and ingredients for the meals. However, at the time of the study they only provided the food and had withdrawn from providing fuel(firewood). The head teachers stated that in the future the NGOs would withdraw from the feeding programmes. This would highly affect the early childhood learners, especially those from the disadvantaged socio-economic status. This research findings concur with those of Nikinyangi(1988) that well-nourished children perform better in class than those who are poorly feed. The teachers also attested to the fact that when children get good nutrition they are able to concentrate, do not get irritated easily and have consistency in their performance.

Sponsors	Frequency	Percent
Parents	1	25.0
School	1	25.0
School + NGO	1	25.0
Parents + School	1	25.0
Total	4	100.0

Table 1: The financiers of School Nutrition Programmes

The research also sought to determine the environment where the meals are taken by the children when they are having their school nutrition programme. Among the four sampled schools offering the school meals programme, a half of the schools offered the meal in classroom, another one-quarter offered the meals in kitchens and the other quarter in the open field. These results concur with those Bunde (2016) who established that most of the pre-primary schools offer school feeding programmes without any adequate funding. The funds from parents are not enough to run the programme which requires other facilities such as kitchen and dining rooms. Most of the children who ate in the open fields said their schools did not provide the feeding programmes in school. Their parents also gave packed food from home which they ate cold. Some parents also gave the children money to buy food from the kiosks which in most cases comprised snacks with hardly any nutritional value.

	Frequency	Percent
Classroom	2	50.0
Kitchen	1	25.0
Open field	1	25.0
Total	4	100.0

Table 2: Places where Children took their Meals

Information on the type of food provided in school feeding programmes was also sought from the school head teachers. Their responses were as presented in Figure 1 below.

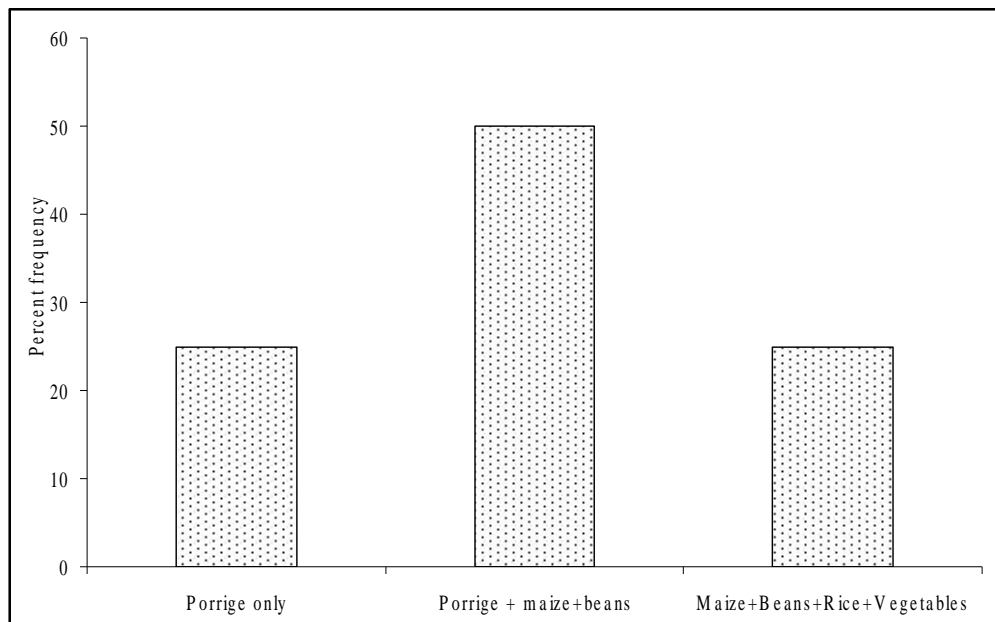


Figure 1: Type of food served in schools during the school nutrition programme

The head teachers were asked whether the school feeding programme improved performance of the children and based on the response, 100% of the head teachers attested that the school nutrition programme improved children performance.

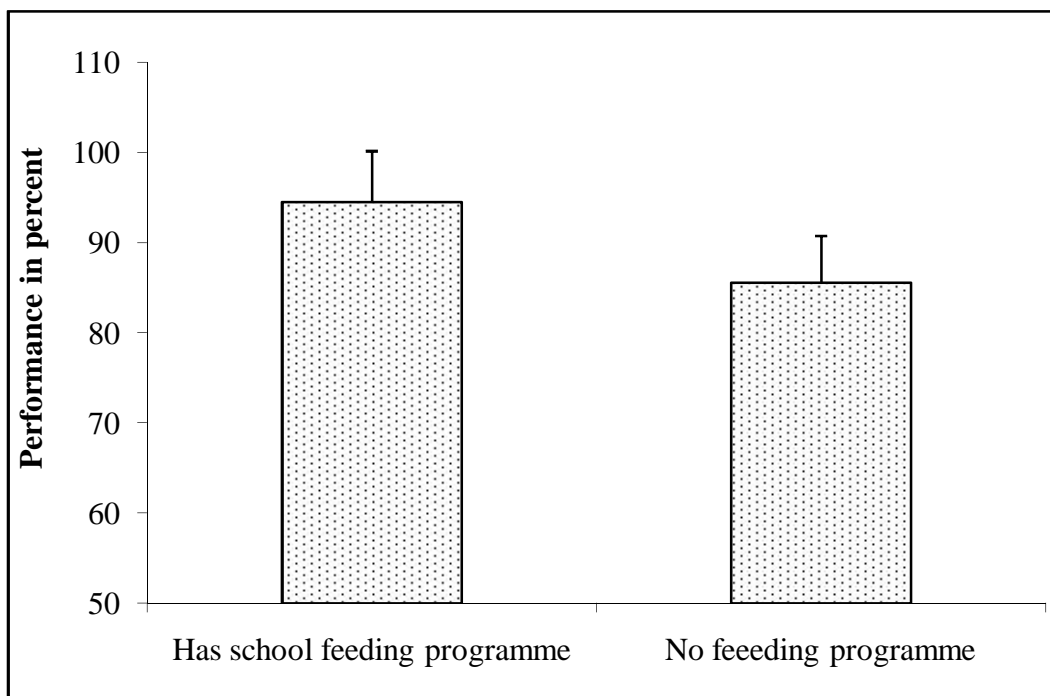


Figure 2: Comparison of Children's Performance in Number Work in the two School Categories

The overall performance of the children was also determined relative to schools that provide nutrition programmes vis-à-vis the schools that do not provide any school nutrition programme (Figure 2). Based on the performance, it was established that there were significant differences in performance between schools that provide nutrition programme ($94.5 \pm 3.1\%$) compared to school that did not have any school nutrition programme ($85.4 \pm 5.1\%$). When the results were further tested using t test, there were significant differences in the performance of the children in number work ($t = 17.834$, $df = 1$, $P = 0.0032$).

4. Conclusion and Recommendations

From the study, it was concluded that school feeding programmes are a vital intervention that has tremendous benefits to education. Initially, all schools did not have feeding programmes; but through the support of the Non-Governmental Organizations the feeding programmes were established through the Mary's Meals. The study also found out that the diets provided in school meals were balanced and majority of the parents were happy with the programmes since their children got balanced meals at school.

The ministry of education through the county governments quality and assurance personnel should ensure and insist that all schools implement the school feeding programmes in the early childhood education schools to provide the children with a suitable environment for learning.

The school feeding provided to the children should be balanced, adequate in quantity and administered in the required frequency so as to respond to the needs of the children. It is recommended that pre-school administrators should be sensitized on the need to ensure that food supplied to their pre-schools are adequate and contain all the nutrients crucial for the growth and development of the pre-school children.

The standard measure for serving food should be according to the children's needs. The quantity of food given to the children should vary according to the different needs of the children since all children are different and vary in their needs.

Parents and sponsors of the feeding programmes should provide adequate funds to enable schools run the school feeding programmes smoothly without any hitches.

Schools should ensure that those concerned with food preparation should observe hygienic conditions while preparing food to avoid contamination which may lead to food poisoning.

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