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An Investigation of Nutrition in Selected Early Childhood Education Centres in Lusaka, Zambia

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Abstract

Literature underscores the association between nutrition and learning. However, less is known about the nutritional value of foods that children bring to early childhood centres and their implications for general well-being and, consequently, learning in early childhood education (ECE) centres in Zambia. This article reports the findings of research that investigated the types of foods and drinks that children in ECE centres bring from home and their nutritional value. The study employed a case-study research design. Data generation methods included qualitative methods using observations and interviews in ten ECE centres. The sample comprised ten ECE teachers and 442 ECE learners. Thematic analysis was used to analyse the data. Findings suggest that children do not carry meals to school that comprise a balanced diet. They mainly brought foods high in carbohydrates and sugar. Learners bought some of these foods from the tuckshop. Data from interviews showed that teachers understood the need for nutritious, healthy food but were unaware of existing policies on nutrition that would empower them to intervene in the choice of foods children bring to the ECE centres. Teachers also suggested school feeding programmes as a way to ensure that children in ECE received a balanced diet at school.

Keywords: *Nutrition, balanced diet, foods, children's foods*

Introduction

An obvious link exists between health and nutrition, in which most diseases are attributed to poor nutrition, as evidenced by cases of wasting, stunted growth, and obesity, especially in young children. Discussions on nutrition go beyond having food to having the right food in the recommended portions and combinations. Largely, there are agreed standards of what is considered acceptable nutrition, commonly known as a balanced diet, which includes a variety of starches, vegetables, fruit, proteins, and fats (International Federation of Red Cross and Red Crescent Societies 2013:17, 19). In childhood, the period between gestation and six years is particularly important in determining the cognitive and physical prospects of children (UNICEF Zambia programme 2016–2021). Consequently, it is accepted worldwide that proper nutrition is most critical, with indications of irreversible adverse effects of poor nutrition under the age of two (International Federation of Red Cross and Red Crescent Societies, 2013).

In international human rights instruments, proper child nutrition is expressed as a right, hence the call for interventions that address the impacts of bad nutrition practises (Global Child Nutrition Foundation, 2012). For example, the 1948 Universal Declaration of Human Rights adopted by the United Nations General Assembly proclaims in Article 25 that "everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing, medical care, and necessary social services". This article also affirms that "mothers and children are entitled to special care and assistance" (UNICEF, 1998). The 1959 Declaration of the Rights of the Child was adopted by the United Nations General Assembly, with Principle 4 stating that children "shall be entitled to grow and develop in health and have the right to adequate nutrition, housing, recreation, and medical services" (UNICEF, 1998).

The impetus for Early Childhood Education, care, and Development (ECECD) in the 21st century is credited to research evidence pointing to the lifetime implications of early years on the physical, mental, health, learning, and behavioural traits development of children (Young & Mustard, 2008:71). As a result, it has been emphasised that, like all other learning, nutritional and physical activity habits must be instilled in childhood, as "the values, habits, and behaviours developed during this period often influence behaviours in adulthood" (Food and Nutrition Guidelines for Healthy Children and Young People 2015:12). The early childhood development Index by the United Nations Children's Education Fund (UNICEF) presented concerns with its findings that 36.8% of children aged three and four years in Low and middle-income countries do not attain basic cognitive and social-emotional skills (McCoy et al. 2016), citing poor health, nutrition, security and safety, responsive caregiving, and early learning, among others, as responsible (Black et al. 2017). The African mission on ECECD in particular has been coupled with enormous challenges given the alarming poverty levels, especially in Sub-Saharan Africa (UNESCO, 2007). For example, more than half of the adult population in Sub-Saharan Africa faced moderate or severe food insecurity in 2015, and one in four children under the age of five had stunted growth in 2014, with an estimated number of 158.6 million children (United Nations 2016).

In recent years, the focus on nutrition and its association with early education and overall child development has gained momentum. The more recent Global Nutrition Report (GNR) (2018) insinuates that if plans to ensure proper nutrition are not acted upon, the world may continue to struggle with under-nutrition, over-nutrition, and micronutrient deficiency (GNR, 2018; Banda and Mwanza-Kabaghe, 2019). There is evidence that children's nutrition and early education are linked to economic growth and development (Black et al., 2017). The economic consequences of malnutrition represent losses of 11 percent of gross domestic product every year in Africa and Asia, whereas preventing malnutrition delivers US$16 in returns on investment for every dollar spent (UNICEF Zambia programme 2016–2021). The Education for All (EFA) Global Monitoring Report (UNESCO, 2007:106) argues that EFA and the Millennium Development Goals (MDGs) cannot be achieved without significant investment in

young children's well-being. The first two MDG goals were particularly concerned with eradicating poverty and hunger and expanding and improving comprehensive early childhood care and education as a basis for achieving universal primary education for the most vulnerable and disadvantaged children, especially in Africa (UNESCO, 2000). These goals are reiterated in the first four Sustainable Development Goals (SDGs) for 2030: poverty reduction, zero hunger, good health and well-being, and quality education (United Nations 2016). Proper nutrition and education are seen as the surest way out of poverty since they contribute to the increased school completion rate, thus reducing what are often huge government education and health budgets (UNESCO, 2000b; World Bank, 2013).

Worldwide, the major concern is that children suffer the worst consequences as they are at high risk of stunting, being underweight, and wasting. In 1998, UNICEF indicated that 'malnutrition was implicated in more than half of all child deaths worldwide and violated children's rights in profound ways. It also compromises their physical and mental development and helps perpetuate poverty. These realities highlight the importance of nutrition for early childhood development and national development. In recognition of this, the Ministry of General Education in Zambia has provided provision in the school timetable for school feeding programmes. The age range of 0 to 6 years has increasingly become part of schooling, with the adage "learning begins at birth" (UNESCO, 1990:8) becoming a catalyst for an early start in education. It is therefore not surprising that several forms of early childhood development programmes encompass all that relates to children's well-being, such as health, nutrition, water, sanitation, basic care, learning, social protection, and community empowerment (UNESCO, 2000; Aidoo, 2008).

Research shows that children who lack nutrients such as Vitamin A and Iodine in their diet do not have the same potential for learning as healthy and well-nourished children (Del Rosso, 1999; Malama, 2012; Banda and Mwanza-Kabaghe, 2019). Levinger (1992) stated that hunger contributed to disrupting pupils' attention to classroom work and promoted adaptive behaviours of passivity and inactivity. Evidence is consistent that poor nutrition diminishes a child's cognitive development either through physiological changes or by reducing the ability to participate in learning experiences, or both (Chinyoka, 2014).

The International Federation of Red Cross and Red Crescent Societies (2013) reported that nearly one billion people suffer from undernutrition worldwide. The most vulnerable—a third of them—are found in Africa. The Lancet Series of 2013 reported that 45 percent of worldwide cases of child mortality were nutritionally related since poor nutrition makes children more susceptible to diseases. The Zambia Demographic Health Survey (ZDHS) 2015 report on under-five children indicated that wasting, stunting, and under-nutrition in children were high, and as a total of 7.4 million people out of an estimated population of over 14 million were under-nourished (Central Statistics Office (CSO), 2015). In a study conducted in Zambia (UNICEF Zambia programme 2016–2021). Despite malnutrition being widespread and the cause of 40

percent of cases of stunted growth in children under the age of five, it "is the least addressed public health problem in Zambia" (UNICEF Zambia programme 2016–2021).

The National Food and Nutrition Strategic Plans (NFNSP) 2011-2015 and 2018-2022 of the Ministry of Health spell out plans to eradicate multiple causes of malnutrition such as inadequate food intake, inadequate child feeding practises, poverty, and poor access to education, health, and social services in line with international guidelines contained in SDGs 2030, the 1948 UN Charter on Human Rights and Freedoms, as well as the SADC protocol on good governance and human rights with food security as a priority (NFNSP, 2011; NFNSP, 2018; Banda, 2017). The Zambia Seventh National Development Plan 2017-2021 projection for the revamping of the "homegrown school feeding enhancement" as a means to reducing hunger is evidence that school feeding programmes are seen as a surest way of attaining learning alongside nutrition (7NDP 2017-2021:84)**.**

While there are significant milestones in the policy and development of school feeding in Zambia, feeding activities for children in nursery schools are rarely reported because, until 2013, ECE was in the hands of the private sector. Since then, the Government of Zambia has introduced compulsory public ECE in Zambian primary schools (Mwanza-Kabaghe 2015; Mwanza-Kabaghe et al. 2015). As ECE is a relatively new undertaking by the Ministry of General Education (MoGE) in Zambia, the current study could be used as a reference point to influence national policies on feeding interventions in ECE going forward. The study draws on previous literature that highlighted nutrition deficiencies in children in Zambia. These include the Zambia Demographic Health Survey (ZDHS) 2015 report on under-five children (Central Statistics Office (CSO), 2015), Malama (2012), the Ministry of Education (2007), and Educating Our Future (1996:73).

Given the importance of nutrition in early childhood, this study was aimed at establishing the kinds of foods children bring to selected early childhood centres in Lusaka with the view of indicating their nutritional value. The study was consequently guided by four (4) main objectives: (1) to establish the kinds of food that children in ECE bring from home with the view of determining their nutritional value. (2) To determine if schools have a policy that specifies which foods children should bring to school; (3) To determine if ECE teachers understand the importance of nutrition. (4) To find out how teachers think nutrition for ECE children can be improved in schools.

Limitations of the study

One of the major limitations of the study is that it was conducted in only 10 schools in Lusaka District, which is predominantly urban. There is a need to conduct a much broader study that will cater to rural and urban settings, as this will provide a comprehensive view of the types of food children bring to school. Therefore, this affects the generalizability of the study to other parts of Zambia. The other limitation is that the researchers did not speak to parents to get a better understanding of what

foods they eat at home. It may be possible that the ECE children have healthier meals at home.

Literature review

The following are themes of literature that were reviewed for the study:

Nutritional requirement for children aged 0-8 years

It is generally agreed that the principles that guide adult nutrition are applicable to children as well. However, children need specific nutrients at various ages because they grow rapidly. Understanding which foods contain the necessary vitamins and nutrients for a child's health and which ones are lacking can decrease the likelihood of children developing nutritional deficiencies and promote their overall cognitive health. Preschool-aged children are especially susceptible to nutritional deficiency because development in early childhood is linked to a higher demand for nutrients and energy to support the physical needs of the body for rapid growth and brain development, rapid recovery from infection, and general movement (Suhu, 2020).

Cusick & Georgieff (2016) reported that critical nutrients required during this developmental stage include carbohydrates, protein, long-chain polyunsaturated fats, iron, copper, zinc, choline, and vitamins, with protein, iron, and zinc being common to all developmental stages. The New Zealand Food and Nutrition Guideline (2012:15) and the British Nutrition Foundation (2019) recommend that food from the four groups of carbohydrates, proteins, fats, vitamins, and minerals be served daily to children in the right quantities. Carbohydrates are one of the main sources of dietary energy in infancy and childhood and are essential for the growth and development of babies and toddlers. Carbohydrates can be found in a wide variety of foods, like grains, beans, fruits, vegetables, nuts, and seeds. Since children are generally physically active, their food must have sufficient energy. In particular, protein intake is important because it provides essential amino acids required for protein synthesis, which are necessary for growth. High-quality proteins are red meat, poultry, fish, milk, yoghurt, cheese, and eggs. Protein, on the other hand, is responsible for the proper structural development and maintenance of the brain. When intake is too low, growth during childhood is restricted (Braun, 2016). Another macronutrient is fat. Fat is known to play an essential role in the development of the brain and retina. It is said that when dry, 60% of the brain is comprised of the long-chain omega fatty acids DHA and EPA, which are essential to the formation of grey matter, the central nervous system, and cognitive performance (Benton, 2010; Nyaradi et al., 2013).

Georgieff (2014) emphasises that children between the ages of 1 and 8 need the following nutrients: proteins, micronutrients, iron, zinc, vitamin A, vitamin D, and iodine. Vitamin D is responsible for bone health and also plays a role in brain development through its regulation of large numbers of genes (Levenson & Figueiroa, 2008).

Iodine is a necessary nutrient for thyroid hormone synthesis, which is critical for normal brain development (Georgieff, 2014). According to WHO (2012:2), "an

increase in potassium intake from food is required to control blood pressure in children." Additionally, the brain requires Zinc to be incorporated into enzymes mediating protein and nucleic acid biochemistry. Zinc, on the other hand, regulates brain growth; a deficiency of it leads to cognitive problems.

Because children grow rapidly, they require foods that are high in iron, such as lean meats, legumes, fish, poultry, and iron-enriched cereals. Other important micronutrient requirements during childhood include adequate calcium and vitamin D intake. Both are needed to build dense bones and a strong skeleton. Calcium is necessary to achieve peak bone mass. Calcium also helps bones grow and develop normally. It is present in milk, cheese, yoghurt, and cottage cheese. The recommended intake includes 700 mg for children aged one to three, 1,000 mg for children aged 4 to 8, and 1,300 mg per day for children aged nine to eighteen. And finally, omega-3 fatty acids, abundant in fish, fish oils, and algal oils, are responsible for proper cognitive development in children (Geogief, 2014). For the brain to maintain and form synaptic connections during growth, it needs a lot of vitamins in addition to other enzymes and minerals. Vitamin C has also been found to be crucial to a healthy diet. Vitamin C has been linked to the prevention of respiratory tract infections (RTI) in children (Garaiova et al. 2015). Georgieff (2014) asserts that children's developing brains need all the nutrients that alter the neurophysiology, such as glucose, proteins, iron, zinc, iodine, and choline.

Some guidelines on children's foods are that they must include a variety of grains, fruits, and vegetables, be limited to refined grains, be low in sugar, especially added sugar, be low in fat, have pure fruit juices, and lots of water (The New Zealand Food and Nutrition Guideline 2012: 6; Mayo Clinic 2019). Breakfast is particularly noted for guaranteeing "cognitive function, academic performance, school attendance, psychosocial function, and mood in children and young people" (The New Zealand Food and Nutrition Guideline 2012:15). This could explain the recent introduction of breakfast in all primary schools in Botswana (2019). Lunch is important for meeting children's energy requirements.

Zambia's Nutritional Guidelines for Early Childhood Education

The Ministry of Health (MOH, 2016) reported that boys and girls who enter adolescence malnourished exhibit a high prevalence of micronutrient deficiencies. Realising the importance that proper nutrition plays in the production of a well-rounded early childhood learner, the Republic of Zambia has put in place guidelines to regulate the foods eaten by the learners in early childhood education centres. According to the Ministry of General Education, the early childhood education centre, in collaboration with the health centre, should ensure that learners are supplemented with Vitamin A capsules once a year. Additionally, iron tablets should also be given to the children. The ministry of health and the national food and nutritional commission (2016) recommend the following guidelines: feed a variety of foods to ensure that nutrient needs for Vitamin A, iron, and energy are met. A suggestion is also made that

community-based feeding schemes in and out of school, such as community youth clubs and youth-friendly corners, should be introduced and established in order to promote supplementation of iron and folic acid deficiencies and promote the production and consumption of iron-rich and bio-fortified foods like beans (MOH 2016).

Furthermore, the Ministry of General Education has called for regular monitoring of foods sold on school grounds to promote healthy feeding and eating practises in ECE centres. Depending on the context, "provisions for non-monetary exchange of healthy food stuffs for learners can be made depending on the context; the family, especially parents as primary caretakers, should prepare and pack healthy foods for their children to eat at school" (Ministry of General Education Standard Guidelines, 2014:13). The consumption of traditional and local foods of high nutritional value is highly encouraged. These must be prepared and served in hygienic conditions, with those involved in handling the food "medically examined and certified every six months" (Ministry of General Education standard guidelines, 2014:13). This has since become mandatory for food handlers in every school, including ECE centres.

Other necessary conditions outlined in the guidelines on nutrition in ECE are that good eating habits should be encouraged. This should include hand washing facilities with soap and clean, safe drinking water. Parental education and advice are also seen as necessary in ensuring that school and home efforts on children's nutrition are sustainable. In the guidelines on nutrition, the Ministry of General Education (2014:13) postulates that the attainment of good nutrition in children requires that parents, as primary caretakers, acquire knowledge and skills that can consequently support their children's development into healthy and productive adults. Therefore, the school must ensure that "information on nutrition and health in ECE is communicated to parents. This can include the promotion of the consumption of micronutrient-rich foods such as green leafy vegetables, fortified foods such as sugar, the use of iodated salt, and eating a variety of foods. These efforts can be coordinated through nutrition clubs in schools and communities.

Importance of nutrition in early childhood centres

Malnutrition is a public health issue that affects one in three children worldwide as a result of poor nutrition practises. Early childhood educational centres (ECEs) are places where children spend a long amount of time. Children eat about 30% of their food and drink during the school day, giving schools a chance to improve dietary quality (Nathan et al., 2019). This makes ECEs an ideal entry point to positively influence child nutrition. According to research, schools and childcare facilities can play a significant role in developing healthy food environments and encouraging children to adopt healthy eating habits (Bennett & Burns, 2020). The school food environment provides an opportunity to improve the health of children (Pillay, Ali, & Wham, 2022). Proper nutrition in early childhood supports development and growth. Nutrition through vitamins and nutrients is a key influence; if provided in ample amounts, the brain may develop to its full potential (Nyaradi, Li, Hickling, Foster, &

Oddy, 2013). Unfortunately, children are not consuming the healthy foods that they need to fuel brain development. Due to the prevalence of snack foods and fast foods. Nutrition and physical fitness significantly impact a child's health, improving cognitive function and allowing them to focus on physical, intellectual, and emotional growth. A balanced diet with essential vitamins, minerals, proteins, fats, and carbohydrates is crucial for pre-schoolers. The benefits of good nutrition in a well-balanced diet are that it prevents malnutrition, helps build the child's immunity, reduces the chances of the child being underweight or obese, and even minimises the chances of chronic health issues when they get older. In addition to the necessary health benefits, healthy eating has numerous intellectual advantages that make it essential for early childhood education. Improved nutrition, according to studies, has a significant favourable effect on memory, concentration, and other learning behaviours as well as academic success (Maniaci et al., 2023; Asmare et al., 2018).

Nutritionists posit that good eating habits should be formed as soon as possible because they have been shown to persist into adulthood and can affect a child's growth, general health, and developmental trajectories (Asmare et al. 2018). For instance, studies on children as young as 3 years old have shown that improper dietary intakes have an impact on cardiovascular disease indicators such as obesity, dyslipidemia, and high blood pressure, which can last into adulthood (Jackson *et al. 2020).* Lack of nutritious, healthy food in children has an impact on their cognitive outcomes (Swindle et al., 2021). In addition, dietary habits established during childhood are known to influence behaviour in adulthood and may impact health later in life (Swindle et al., 2021). Overall, poor diet quality during childhood may lead to the development of chronic disease later in life.

Health implications associated with foods and snacks in ECE centres

Research indicates that the foods brought by early childhood learners to school lack proper nutrient requirements for their age (Ministry of General Education Standard Guidelines, 2014). Consequently, several implications for health are associated with the various snacks and foods that children carry in ECE centres. The Centre for Disease Control and Prevention explains that many of these foods are comprised of empty carbohydrates like sugar and unhealthy fats while lacking the healthy ingredients essential for the body (CDC, Braveman et al. (2016) note that while good health is essential to the well-being of children, chronic malnutrition is widespread among schoolchildren in many developing countries. Malnutrition can create serious issues for children in the first 5 years of life, mainly due to the fact that nutrient-rich foods are necessary in a young child's diet because of the major brain development that occurs within the first few years of life. In addition, research has shown that undernutrition is a major public health challenge affecting academic school achievement (Maniaci et al., 2023; Asmare et al., 2018).

The few available data on low-income countries show that the nutritional and health status of school-going children is highly reflected in those in ECE. Undernutrition and micronutrient deficiencies continue to impede the growth of

children when they reach school, reduce their capacity and motivation to learn, lead to school dropout, and lead to the general underperformance of learners in schools. Due to this uncurbed impediment, micronutrient deficiency also retards the intelligence quotient (IQ) for learners at all levels of learning (Braveman et al. 2016). In a study of children from low-income families, it was found that those who consumed low-calorie, nutritionally deficient diets as young children later on in life had lower IQ scores, more serious cognitive function, and more behavioural problems (Prado & Dewey, 2014).

The main nutritional problems among children include stunted growth, underweight, and wasting (Mwanza-Kabaghe et al. 2019). Additionally, the other associated healthy implications of snacks high in sugar, salt, and fat are that they lead to infectious diseases and slow the physical and mental growth of children. Overweight and obesity are also reported to be a result of micronutrient deficiencies in children (Sherman & Muehlhoff, 2007). According to Sherman and Muehlhoff (2007), micronutrient deficiencies include iron, iodine, and Vitamin A. However, this research focused on Nutrition in primary schools and did not take into consideration the nutritional requirements impacting those in early childhood education, leaving a gap that needs serious attention.

Methodology

Study design: The study used a case study research design, which enabled the collection of qualitative data through the naturalistic observation method. The researchers observed children during school meal times. This provided an opportunity to take note of the food they were eating. When observations were complete, the researchers conducted interviews with ECE teachers.

Study instruments: An interview schedule was used for interviews with the teachers. The schedule contained three main questions that focused on establishing their understanding of the importance of nutrition at the ECE level, their thoughts on how nutrition in ECE could be improved, whether the school had a policy regarding foods children should bring, and if they thought schools should have policies that guide what foods are brought by the children. An observation schedule was devised to note what foods children had carried and the category in which they fell (carbohydrates, protein, vitamins, and minerals). During observations, researchers took note of what children were eating.

Sample and sampling procedure: The study sample included 10 government-run ECE centres in Lusaka province, Zambia, and their teachers (10). Convenient sampling was used to select the ECE centres in Lusaka district. A total of 442 children were observed. The average number of ECE learners in each classroom was 44. The number of learners in the classrooms ranged from 26 to 80. The age of the learners in the classrooms ranged from 3 to 8 years. While some classes had children of the same age, others had learners of varying ages. All the classes observed came in the morning session and had their meal times between 9 and 10:30, depending on the school and what time they started school. In all the schools, the mealtime lasted 30 minutes.

Procedure: Appointments were made in advance with all the schools. On the day of data collection, the researchers arrived at the schools early. They explained the purpose of the study. Additionally, the researchers explained that the teachers were not undergoing assessment and were in no way involved in the teaching and learning. Instead, the focus of the study was to learn what foods children brought to school. The ECE teachers introduced the learners to the observers as individuals who were visiting the class. The researchers sat either behind the classroom or in a corner where they would not disturb the class or take the children's attention away from their meals. After the observations, the researchers conducted one-on-one interviews with the teachers involved.

Data analysis: This was a purely qualitative study, and therefore the collected data was analysed using thematic analysis.

Findings and discussion

The subsequent section presents the findings and discussion.

Types of food ECE children bring to school from home.

One of the objectives of this study was to determine the types of food children brought to school from home, with the view to determining their nutritional value. The study revealed that children brought a wide range of food (cooked and uncooked). They also brought a variety of drinks. The table below presents these findings.

Table 1: Foods brought by children in ECE.

Main food	Comment on nutritional value
Sweet potatoes (boiled and fried)	This is a starch based tuber high in fibre and minerals such as potassium and Magnesium and vitamins A, C, B6 and E. Both boiled and fried are considered appropriate methods of cooking sweet potatoes (Sullivan 2016)
Irish potatoes (boiled or fried into fries/chips)	Irish potatoes are high in Vitamin C, Potassium, Vit B6 and amounts of magnesium, phosphorus, iron and Zinc. Boiled potatoes are preferred because fried are very high in calories, fat and salt (Shmerling 2019)
Bread (with margarine or plain)	Good source of fibre and carbohydrates, B vitamins and calcium, iron minerals.. High in carbohydrates, low in micronutrients (Dewettinck & Gellynck 2008). Margarine is high in saturated fats (Khosrova 2016).
Jiggies and corn puffs	Details on packaging show protein 6.09g/100g, carbohydrates 64.65g/100g, Fat 25g/100, energy 515.61g. No additional nutritional value.
Biscuits	The biscuit *Go-goes* was mostly carried by children. On the packaging the following are indicated 68.34% Carbohydrate, 485.34% energy, 19.74% Oils, 0.48% fibre, 8.58% protein.
Noodles	Indicated on a packet of *Eezee* Noodles is 75 grams. Vitamin A, B6, B12, D, Iron, Calcium between 0.144-92 mg perm70g, Saturated fats 12g, Carbohydrates 45g per 70g, Fibre 0.9g per 70g, Protein 6g/70g and Sodium 1339mg/70g.

Rice (with milk or gravy from tomatoes and onions)	Rice Contains carbohydrates, some protein, no micronutrients (Raman 2018).
Popcorns	High fibre carbohydrates, antioxidants, vitamins and minerals (Franklin 2013).
Sausage	Meat product high in fat with spices and other flavourings (Gillian 2007).

Table 2: Drinks brought by children in ECE

Type of drink	**Nutritional value**
Fanta, *Appy apple*, *Yes drink*	Fanta 166KJ/350ml, Sugars 4.6g and sweeteners *Appy Apple* 200kg/100, sugars 18.2 per 200ml *Yes drink* 200kg/100, sugars 18.2 per 200ml
Fruit juice	120 calories per glass, sugar, preservatives
Maheu	Energy 275kj/100ml which is 642KJ, Sugar 19.4g per 250 ml, Sodium 120g per 250ml, Calcium 95g /250ml, Fibre less than 0.5g /250ml

The results of the study show that the food children brought to or bought from school can be classified as 1) Main food, which included fried or boiled sweet potatoes, boiled or fried chips, plain bread or with butter spread, rice served with gravy or milk, and noodles; 2) varieties of corn-based snacks commonly known as jiggies and puffs, biscuits, and popcorn; 3) Drinks including carbonated (Coca-cola and Fanta, Appy Apple, and Yes Drink), corn-based (Maheu), fruit juices, and 4). It should be noted that children did not carry food that would be from each category but combinations of one of the aforementioned foods and juice or carbonated drink. This finding suggests that children in ECE did not carry food that would represent a balanced diet, which would include foods containing carbohydrate, fat, protein, vitamins, and minerals in the recommended quantities (The New Zealand Food and Nutrition Guideline 2012:15, The British Nutrition Foundation 2019).

While it may be the case that children may eat other meals before and after school, what they bring to school or buy from the tuck shop can in many ways represent nutritional understanding by the parents and school. It is recommended that children be given a wide variety of foods from all the food groups. While fruits are most preferred, the results of this study show that in four of ten schools, children did not bring fruits. A look at the nutritional contents of the foods, snacks, and drinks in tables 1, 2, and 3 shows that a number have a high concentration of energy, which in this case represents sugar, ranging from 485.34 to 630 kilojoules. This is way above the recommended 100 calories for children. Schools are encouraged to limit the sale of snacks high in fat, sugar, and salt in an effort to increase fruit consumption and reduce the prevalence of dental caries (Freeman et al., 2001).

Labels on snacks found in schools show that most have sugar as the main ingredient. Hartney (2019) has written about how snacks with sugar are readily used

to appease children and goes on to explain that eating too much sugar can cause sugar addiction, which has the potential to cause physical and psychological harm in children. The physical harm that may result includes obesity, malnutrition, and tooth decay, while psychological ones may show in mood changes, hyperactivity, or underactivity, and a lack of ability for delayed gratification. Hartney (2019) explains the weight gain that may be caused by a high intake of sugar. Contrary to the understanding of malnutrition as a lack of food, excess of a particular food item, such as sugar, is also malnutrition. In this sense, extremes of under and overnutrition are all forms of malnutrition. There are two reasons why foods and beverages high in sugar are discouraged. Firstly, they tend to have less iron and calcium, which are essential for growing children's bone development and blood supply. Secondly, they are the main cause of tooth decay in children. In the case of ECE centres involved in the study, foods such as biscuits and beverages such as Fanta and 'Appy' Apple drinks may be considered high in sugar.

Most of the food that children bring can be classified as junk given its high calories from sugar or fat, little dietary fibre, and lack of sufficient carbohydrates, protein, vitamins, and minerals (Brendon 2006). Most fried foods are said to contain trans-fats associated with obesity, cancer, and diabetes. Once oils are heated at high temperatures, their trans-fat content can increase (Fleck 2018). Most recently, the term HFSS (high in fat, salt, and sugar) has been used for the category of salted snacks, gum, candy sweets, desserts, fried fast foods, and sugary carbonated beverages. Junk foods have seen a rise in consumption given their convenience, price, and taste. While junk foods are readily appetising, their regular consumption can be fattening, addictive, and likely to cause obesity, chronic illness, low self-esteem, and even depression (Fleck 2018). In the short term, the consequences of high consumption of junk food are of particular significance due to their potential to negatively impact children's concentration and energy levels, which are the backbone for both academic and physical wellbeing (Fleck 2018). In the long term, Hartney (2019) makes reference to a longitudinal study of children aged 10 years into adulthood that showed that those whose intake of sugar was high exhibited a high affinity to commit crimes and delinquent behaviour.

Table 3: Fruits brought by ECE children

Type of fruit	Nutritional value
Bananas	Fibre, iron, magnesium potassium and vitamins A, B6 and C (Ramages 2016)
Apples	Beta-carotene, Calcium, Fibre, Potassium, and Vitamins B6, C, E, K (Ramages 2016)
Oranges	Calcium, Iron, Magnesium, Potassium and Vitamins A, B6 and C (Ramages 2016)
Guavas	Rich in antioxidants, Vitamin C, Potassium, and fiber (Sauls1998)
Grapes	Iron, Fibre, Potassium, Vitamin A and C (Ramages 2016)

The above results indicate the different types of fruits that children brought to school. It is important to note that out of the 10 schools, 4 had children who did not bring any fruits at all. Furthermore, in schools where fruits were brought, less than half of the children brought them. This indicates the need to emphasise the importance of children eating fruits for the provision of fibre, vitamins, and minerals, which can help boost immunity. Fruits are low in fat and calories and provide natural sugars, making them a recommended alternative to fizzy drinks (Slavin & Green 2007). While it is advised that children should carry a variety of fruits in order to maximise the range of vitamins and minerals in different fruits (Slavin & Green 2007), it was observed that children carried only one type of fruit. Apart from bananas, most of the fruits indicated in the above list are exotic, which may explain why they are expensive. Other fruits locally grown in Zambia include Mango, Papaya, avocado, and various citrus fruits. Nutritious traditional foods include masau (similar to sour apples), masuku (with a plum-like taste), mauyu (baobab seeds), msinika, and mpundu, among others. None of the learners brought traditional fruits.

Nutrition policies in ECE centres

The National School Health and Nutrition Policy (2016) stipulates that good health and nutrition are not only essential inputs but also important outcomes of quality basic education. The policy also notes that learners must be healthy and well-nourished in order to fully participate in education and gain its maximum benefits. When asked if the ECE centres had a policy that specified which foods children should bring to school, all 10 teachers interviewed revealed that their schools did not have a policy that stipulated which foods children should bring to school. Therefore, parents were free to give their children any type of food. This explains the wide range of food and drinks identified in tables 1, 2, and 3. Generally, most Government schools in Zambia do not dictate to parents the type of foods they should pack for their children. In some schools, children were seen buying sweets, biscuits, fritters, and popcorn from the school tuck shops. Since the schools do not have a policy related to food that should be brought, this allows the tuck shop to provide any type of food, including food that may not be healthy for the children.

When asked whether schools should specify the types of food children should bring to school, all the teachers agreed to this suggestion. They explained that this would ensure that children are given healthy food that will positively impact their development. The implementation of this will need to be done in collaboration with the parents, as most of them give their children the food they can afford or that is convenient for them to prepare.

Interviews with teachers revealed that they are not aware of the policy guidelines on what children should bring to school as stipulated by the National School Health and Nutrition Policy (2016). Most notably, the guidelines include the supplementation of learners with Vitamin A capsules once a year and Iron tablets often. Additional guidelines are found in the Ministry of Health and the National Food and Nutritional Commission (2016) as follows: feed a variety of foods to ensure that nutrient needs for Vitamin A, iron, and energy are met. A suggestion is also made that community-based feeding schemes in and out of school, such as community youth

clubs and youth-friendly corners, should be introduced and established in order to promote supplementation of Iron and Folic acid deficiencies and promote the production and consumption of iron-rich and bio-fortified foods like beans (MOH 2016).

The Nutritional guidelines by the Ministry of General Education postulate that there is a need for serious intake of foods that supply the body with sufficient nutritional contents. Based on the study findings, compliance with the nutritional guidelines for ECE learners is lacking. This finding is a reflection of the knowledge of parents in so far as nutrition is concerned. According to FAO (2008), food insecurity exists when people have no knowledge of or physical or economic access to sufficient safe and nutritious food for a healthy life.

Teachers' understanding of the importance of nutrition

All the ECE teachers in the study acknowledged the importance of good nutrition for ECE learners. When asked why it was important for ECE learners, all the teachers indicated that nutrition was important for the physical and cognitive development of the children. They explained that poor nutrition could lead to malnutrition, which in turn would cause delayed development in the child. They also noted that poor nutrition could lead to poor academic performance, loss of concentration during class, and poor social interactions in tandem with two recent studies by Metos, Sarnoff, and Jordan (2019) and Adams et al. (2019).

A look at the Early Childhood Education Teachers' Diploma Syllabus (2015:36–39) found a course called health education. The outcome of the course is to develop teachers' ability to understand health and nutrition in relation to child development, with the key competence requirement being the ability to plan and prepare a balanced diet. Content in the course includes various kinds of foods, reasons why we eat food, the importance of a balanced diet, different sources of various types of food, why it is important to eat clean food, food poisoning**,** various ways of preserving food**,** good and bad eating habits, and why it is important to chew food thoroughly before swallowing. The information found in the syllabus is restricted to knowledge. It was clear that the teacher had no role to play in influencing parents' decisions on what they packed for their children.

Teachers' thoughts on how nutrition for ECE children can be improved in schools

ECE teachers were asked to give suggestions on how nutrition in ECE can be improved. The most common suggestion was that schools should prepare meal plans and provide food for the children. This means that the school will be responsible for what children eat during meal times. The advantage of this suggestion is that the schools are likely to ensure that the food given to the ECE children is appropriate for the age group and needed for their optimal development. The challenge with this suggestion may relate to the resources needed to purchase the food. However, if schools worked with the Parent-Teacher Committees (PTCs), this option would be viable.

The second response was that the government should provide food to the schools for the learners. This is already happening in some rural schools under the school feeding programme (Banda and Mwanza-Kabaghe 2019). Teachers suggested this option because they noted that some children do not bring food to school. If they do, they bring unhealthy food because some parents cannot afford to buy healthy food for their children. While this option would be convenient for both parents and schools, the cost implications for the government may be unsustainable. In order for this to succeed, a home-grown school feeding programme would be the best. The current school feeding programmes receive erratic support from the government due to limited resources on its part. Feeding programmes that are deemed successful in schools are those that receive support in the form of labour and resources from the PTC and communities around the school.

The other suggestion made by the teachers is that schools should conduct sensitization meetings with parents on the importance of good nutrition for ECE children and what healthy foods they can pack for their children. Some teachers also indicated the need for additional physical activity for ECE children to compensate for the diet.

Conclusion and Recommendations

The findings of this study established that ECE learners mainly brought foods that are high in carbohydrates and sugar. Food that qualifies as junk was evidently present in the school tuck shops and at home. This may conflict with research that shows foods brought from home are likely to be more nutritious and cost-effective than foods bought either at school or on the way to school (New Zealand Food and Nutrition Guideline 2015).

Most notably, teachers involved in the study understood the need for proper nutrition and suggested school-based feeding programmes as the surest way to ensure that nutritional standards are adhered to in ECE. Furthermore, if schools took on the responsibility of providing food to ECE learners, they would be more likely to provide healthy food. The study provided insight into the fact that ECE teachers are not aware of the government's policy guidelines on what children should bring to school. This renders them passive in ensuring that children carry the recommended foods to school. Recommendations for a multi-sectoral approach involving various government ministries, schools, and parents could be a viable way to ensure the sustainability of school feeding programmes. Parents could be educated on the nutritional value and cost-effectiveness of indigenous fruits. It is advisable that children eat five portions of fruit and vegetables a day.

It is recommended that schools distribute widely the policy on foods that children bring to school as well as food that should be sold at the tuck shop, with a focus on healthy food. Furthermore, parents should be sensitised on the importance of good nutrition for their children in ECE classes and suggestions made on the types of healthy foods that are indigenous and cost-effective that children can bring to school. This could be done, especially during parent-teacher meetings. The

government should continue with the school feeding programmes. Furthermore, the government can mandate that all schools have school feeding programmes supported by the schools and the communities where the children come from. This will ensure the sustainability of school feeding programmes.

References

Cusick, S.E.; Georgieff, M.K. (2016). The role of Nutrition in Brain Development: The Golden Opportunity of the "First 1000 Days". *Journal of Pediatrics, 175*, 16–21.

Jackson, J., Wolfenden, L., Grady, A. *et al.* (2020). Early childhood education and care-based healthy eating interventions for improving child diet: a systematic review protocol. *System Review,* **9**(181). https://doi.org/10.1186/s13643-020-01440-4

Nyaradi, A., Li, J., Hickling, S., Foster, J., & Oddy, W. H. (2013). The role of nutrition in children's neurocognitive development, from pregnancy through childhood. *Frontiers in Human Neuroscience*, 7. https://doi.org/10.3389/fnhum.2013.00097

Maniaci, G., La Cascia, C., Giammanco, A. *et al.* (2023). The impact of healthy lifestyles on academic achievement among Italian adolescents. *Current Psychology,* 42, 5055–5061. https://doi.org/10.1007/s12144-021-01614-w

Asmare, B., Taddele, M., Berihun, S. & Wagnew, F. (2018). Nutritional status and correlation with academic performance among primary school children, northwest Ethiopia. *BMC Res Notes* **11**, 805. https://doi.org/10.1186/s13104-018-3909-1

Suhu, K. S. (2020). The importance of nutrition for development in early childhood. Desertion. California State University.

Garaiova, I., Muchová, J., Nagyová, Z., Wang, D., Li, J. V., Országhová, Z., … Ďuračková, Z. (2015). Probiotics and vitamin C for the prevention of respiratory tract infections in children attending preschool: a randomised controlled pilot study. *European Journal of Clinical Nutrition*, 69(3), 373– 379. https://doi.org/10.1038/ejcn.2014.174

Prado, E. L., & Dewey, K. G. (2014). Nutrition and brain development in early life. *Nutrition Reviews*, 72(4), 267–284. https://doi.org/10.1111/nure.12102

Bennett,L . &, Burns, S. (2020). Implementing health-promoting schools to prevent obesity. *Health Education*. 120(2), 197–216.

Pillay, D., Ali, A., & Wham, C. (2022). Examining the New Zealand school food environment: What needs to change? Nutrition reviews, 1-14. Doi:10.1017/S0954422422000154

Swindle, T., Phelps, J., Schrick, B., & Johnson, S. (2021). Hungry is not safe: A mixed methods study to explore food insecurity in early care and education. *Appetite*, **167**, 105626. https://doi.org/10.1016/j.appet.2021.105626

Braun, K.V. , Erler, N.S., Kiefle-deJong, J., Jaddoe, V. W.V., Hooven, E.H V., Franco, O.H. & Voortman, T. (2016). Dietary Intake of Protein in Early Childhood Is Associated with Growth Trajectories between 1 and 9 Years of Age, *The Journal of Nutrition*,146, (11), 2361–2367, https://doi.org/10.3945/jn.116.237164

Adams H, Mwanza-Kabaghe S. , Mbewe E.G. ,Kabundula P., Potchen, M.J Maggirwar S., Johnson BA, Schifitto G., Gelbard H.A, Birbeck G.L

, Bearden D.R .The HIV- associated neurocognitive disorders in Zambia (HANDZ) study: protocol of a research program in pediatric HIV in sub-Saharan Africa *HIV AIDS Infect Dis,* 5 (2019), pp. 1-18.

Aranceta, J. (2003). Community Nutrition. *European journal for clinical nutrition* , pp. 79-89.

Banda, E. (2017). *An Evaluation of the Implementation of Home Grown School Feeding Programme in Selected Primary Schools in Nyimba District*. Unpublished Masters Dissertation, University Of Zambia Library.

Banda, E. & Mwanza-Kabaghe, S. (2019). Roles of Pupils, Parents, Teachers, Headteachers and District Education Office in Home Grown School Feeding in Nyimba district, Zambia. The Zambian & Global: *Academic Journal for Research and Development. 2nd Quarter 2019, In Press*.

Braveman, S.E, Egerter,S. & Mockenhaupt,R.E. (2016). Health is more than health care in Temple, J.A., Rolnick, A.J. and Reynold,A.J (Eds) *Health and Education in Early Childhood, predictors, interventions and policies*. United Kingdom: Cambridge University Press.

Brendon, O. (2018). *Is This What We Call Junk Food*? BBC News. Accessed 09/10/2019.

Bundy, D., Burban, C., Grosh, M., Geli, A, Jukes, M., and Drake. (2012). *School Feeding: Linking Education, Health and Agricultural Development: Paper for the 2012 International Conference on Child Development*. China Development Research Foundation.

Bundy, D., Burban, C., Grosh, M., Geli, A, Jukes, M., and Drake. (2009). *Rethinking School Feeding: Social Society Nets, Child Development, and the Education Sector.* Washington, DC: World Bank/ World Food Programme.

Bundy, D., Burbano, C., Woolnough, A., and Drake, L., (2016). *Global School Feeding Sourcebook: Lessons from 14 Countries*. London: Imperial College Press.

Central Statistics Office (2015). *Zambia Demographic and Health Survey 2013-14.* Lusaka: Ministry of Health.

Chinyoka, K. (2014). Impact of poor nutrition on the academic performance of grade 7 learners: a case of Zimbabwe. *International Journal of Learning and Development. 4(3), 73-84.* Doi:10.5296/ijld.v4i3.6169

Del Rosso, J. (1999). School feeding programme: improving effectiveness and increasing benefit to education, a guide for programme managers. *Partnership for Development* , pp 4-8.

Dewettinck K & Gellynck, X. (2008). Nutritional value of bread: influence of processing, food, interaction and consumer perception. *Journal of Cereal Science* 48 (2), pp 243-257.

Fleck, A. (2018). *How Junk Food Affects Children*. Available at https://healthyeating.sfgate.com/junk-food-affects-children-5985.html. Accessed 05/10/2019.

Food and Agricultural Organisation- Zambia (1990). Available at www. fao.org. Accessed 12/03/2020.

Food and Nutrition Guidelines for Healthy Children and Young People (Aged 2 –18 years) (2015). Available at https://www.health.govt.nz. Accessed 10/06/2019.

Franklin, L.C (2013). Corn in Andrew F. Smith (ed), The Oxford Encyclopedia of *Food and Drink in America*. Oxford: Oxford University Press.

Georgieff, K.M. (2016). The impact of maternal/child nutrion on cognitive development: Prevention implications in Reynolds,J.A., Rolnick,J.A and Temole,J.A (Eds), *Health And Education in Early Childhood, predictors, interventions and policies*. Cambridge: Cambridge University Press.

Gillian, R. (2007). The Oxford Companion to Italian Food. Oxford: Oxford University Press.

Global Child Nutrition Foundation (2012). *Stimulating Economic Development and Improving Food Security through School Feeding Programmes.* Addis Ababa, Ethopia.

Global Nutrition Report (2018). *Shining a Light to Spur Action on Nutrition*. Development Initiatives Poverty Research Ltd.

Kelly, M. J. (1999). *The Origin and Development of Education in Zambia.* Lusaka: Image Publishers.

Khosrova, E. (2016). Butter: A rich history. North Carolina: Algonquin Books.

Lawson, T.M (2012). *A Plan B Paper.* Submitted to Michigan State University in partial fulfilment of the requirements for the degree of Master of Science. Agricultural, Food, and Resource Economics.

Levenson, C.W and Figueiroa, S.M. (2008). *Gestational vitamin D deficiency: long-term effects on the brain*. Nutrition review, 66 pp.726-729.

Levinger (1992). *Nutrition, Health and Learning: Current Issues and Trends*: Newton: Mass Education Development Centre.

Malama, E. (2012). *An Evaluation of the Implementation of School Health Nutrition Programmes in Basic Schools of Chipata District in Zambia.* Masters Dissertation; Solusi University.

Matafwali, B. (2010). *The relationship between oral language and early literacy development: A Case of Zambian languages and English*. Unpublished Ph.D. Dissertation, University of Zambia.

Matafwali, B. and Munsaka, E. (2011). *A Situation Analysis of Early Childhood Education in Zambia*. Lusaka: UNICEF.

Metos, J.M, Sarnoff K, Jordan KC. Teachers' perceived and desired roles in nutrition education. *J Sch Health*, 2019; 89: 68-76. DOI: 10.1111/josh.12712

Ministry of Education. (1977). *Education Reforms. Proposals and Recommendations*. Lusaka: Government Printers.

Ministry of Education. (1992). *Focus on Learning: Strategies for the Development of School Education in Zambia.* Lusaka: Government Printers

Ministry of Education. (1996). *Educating Our Future: National Policy on Education*. Lusaka: Zambia Educational Publishing House.

Ministry of Education. (2006). *National School Health and Nutrition Policy. Lusaka*

Ministry of Health. (2009). *National Food and Nutrition Policy.* Lusaka: Ndeke House.

Ministry of Health. (2011). *National Food and Nutrition Strategic Plan for Zambia 2011-2015.* NFNC, Lusaka

Ministry of Health. (2018). *National Food and Nutrition Strategic Plan for Zambia 2018-2022.* NFNC, Lusaka

Ministry of Health and National Food and Nuritional Commission (2016). *Maternal, Adolescent, Infant and young child Nutrition guidelines*. Lusaka: NFNC.

Mwanza-Kabaghe, S. (2015). *Preschool, Executive Functions and Oral Language As Predictors Of Literacy And Numeracy Skills In First Grade* (Doctoral dissertation, University of Zambia). Retrieved from

http://lollenautafoundation.eu/uploads/sylvia-mwanza-phd-thesis-comp_-513809989.pdf

Mwanza–Kabaghe S, Mbewe E, G[1], Kabundula P., Adams H., Mwiya M., Chipepo K., Birbeck G.L., Bearden D,R. Cognitive Function among ART-treated Children and Adolescents with HIV in Zambia: Results from the HIV-associated Neurocognitive Disorders in Zambia (HANDZ) study (2019) *Journal of The International Aids Society* 22, 48-48 John Wiley & Sons Ltd.

Mwanza-Kabaghe S, Mubanga E, Matafwali B, Kasonde-Ngandu S, Bus A. Zambia Preschools: A boost for Early Literacy? *English Linguistics Research*. 2015;4(4).

Nutrition for kids: Guidelines for a healthy diet. Mayo Clinic Staff. Available at https://www.mayoclinic.org/healthy-lifestyle/childrens-health/in-depth/nutrition-for-kids/art-20049335. Accessed 10/07/2019.

Nutrition Guidelines (2013). Geneva. International federation of Red Cross and Red Crescent Societies. Available at hhtp:// www.ifrc.org. Accessed 02/05/2019.

Raman, R. (2018). *Is White Rice Healthy or Bad for You*. Available at www. health.com/nutrition. Accessed on 10/01/2020.

Ritcher, L., Griesel, D. & Rose. (2000). *The Psychological Impact of School Feeding Project.* Cape Town: Van Schaik Publishers.

Salami. L. I., and Uwameiye. B. E. (2013). Assessment of the Impact of the UNICEF Supported School Feeding Programme on Attendance of Pupils in Federal Capital Territory. *International Journal of Academic Research in Progressive Education and Development January 2013, Vol. 2, No. 1 ISSN: 2226-6348*

Sangweni, S. (2008). *Report on the Evaluation of the National School Nutrition Programme.* Pretoria: Public Service Commission House.

Sauls, J. W. (1998). *Home Fruit Production - Guava*. Texas A & M Horticulture Program. Accessed 17/04/2020.

Sherman, J & Muehlhoff, E. (2007). *Developing a nutritious health Education program for Primary schools in Zambia.* Available at *https://www.ncbi.nlm.nih.gov/pubmed/17996629. Accessed 05/06/2019*.

Slavin, J. & Green, H. (2007). Dietary fibre and SATIETY. *Nuitrition Bulletin* 32(1): pp 32-42.

Sullivan, D. (2016). Sweet potato: Production, Nutritional Properties and Diseases. New York: Nova Science.

The British Medical Journal (1938). *Malnutrition among School Children Vol. 2, No. 4053 pp. 585-586*: Published by: BMJ Stable URL: http://www.jstor.org/stable/20300711 Accessed: 06-12-2016 13:22 UTC

The World Bank*. "Education.*" Retrieved 18/06/2019.

Tomlinson, M. (2007). *School Feeding in East and Southern Africa: Improving Food Sovereignty or Photo Opportunity? Regional Network for Equity in Health in Southern Africa (EQUINET).* EQUINET Discussion Paper Number 46 - March 2007.

UNESCO policy brief on early childhood (2009*). Inclusion of Children with Disabilities: The early childhood imperative*. No 46 April - June 2009.

UNICEF. (1998). *The State of the World's Children*. London. Oxford University Press.

United Nations (2016). *The Sustainable Development Goals Report 2016.* Department of Economic and Social Affairs (DESA); ISBN: 978-92-1-101340-5

Wood, A. P., and Kean, S. A. (1992). Agricultural Policy Reform in Zambia. *Food Policy*, *February 1992: 65-74.*

World Food Programme. (2013). *State of School Feeding Programme Worldwide*. Via. C.G Viola, 68-70, Rome 00148, Italy.

World Food Programme, (2016). *El Nino: Undermining Resilience: Implication of El Nino in Southern Africa from a Food and Nutrition Security Perspective*. Johannesburg: Regional Bureau for Southern Africa.

World Health Organisation. (2012). Guidelines: Potassium intake for adults and children. Available at https://healthyeating.sfgate.com/top.5 essential-nutrients child needs-proper-nutrition-5088.html.

Ministry of Education. (2015). *Early childhood education teachers' diploma syllabus*. Lusaka: *Curriculum Development Centre.*

Ministry of General Education. (2014). *Early Childhood Education Standard Guidelines*. Lusaka: Government Printers.