

# An Observational Study of the School Health and Nutrition Programme in State Schools in Lusaka District, Zambia

Mulenga Chansa Napanje<sup>1\*</sup>, MSc;  Lisanne M. Du Plessis<sup>1</sup>, PhD; Maritha L. Marais<sup>1</sup>, MSc

<sup>1</sup>Division of Human Nutrition, Faculty of Medicine and Health Sciences Stellenbosch University, South Africa

\*Corresponding author: Mulenga Chansa Napanje, MSc; Nutrition and Dietetics, Faculty of Pharmacy, Lusaka Apex Medical University, Plot No 12681/M Hillview Park, Chalala, Kasama Road, P. O. Box 31909, Lusaka, South Africa. Tel: +2 609 68663280; Email: mnapanje@yahoo.com

Received June 07, 2022; Revised July 26, 2022; Accepted September 04, 2022

## Abstract

**Background:** School health and nutrition programmes improve the health and nutritional status of learners, yet their implementation status in Zambia remains unknown. This study aimed to explore the implementation of school health and nutrition programme in one of the districts in Zambia.

**Methods:** This was a descriptive, cross-sectional study conducted in Lusaka district, in 2015. The participating schools, including only state schools in Lusaka district were selected using stratified sampling method. Community and privately owned schools were not included. Herein, 40 school health and nutrition programme coordinators completed a questionnaire based on the guidelines provided by the Ministry of Education. Quantitative data were analysed via Microsoft Excel and Stata. The data obtained from open-ended questions were subjected to content analysis with prominent themes generated.

**Results:** A School health and nutrition programme was observed in 42.5% (n=17) of the schools, but with no significant differences (P=0.601) between the urban and peri-urban ones. Due to insufficient funds and lack of supervision, only some of the recommended activities were implemented, such as school gardens, deworming, vitamin A and iron supplementation, and health education. The schools implementing school health and nutrition activities noted positive changes such as improvement in school attendance, pass rate, and a reduction in diarrhoea and bilharzia among their learners.

**Conclusion:** School health and nutrition programme was implemented by less than half of the schools, still only partially. The effective implementation of the school health and nutrition programme is crucial to improve the health and nutritional status of learners. This necessitates that the Ministry of Education consistently follow up on school health and nutrition implementation.

**Keywords:** School Health and Nutrition programme, Health promotion, Micronutrient supplementation, School learners, Zambia

**How to Cite:** Napanje MC, Du Plessis LM, Marais ML. An Observational Study of the School Health and Nutrition Programme in State Schools in Lusaka District, Zambia. Int. J. School. Health. 2022;9(4):2-11. doi: 10.30476/INTJSH.2022.94680.1247.

## 1. Introduction

School Health and Nutrition (SHN) programmes are health and nutrition-related interventions implemented in schools to improve the health and nutritional status of learners (1, 2). A healthy and well-nourished learner attends school regularly, performs better in class, and has a high chance of staying in school and earn an education (1, 2). SHN programmes have been in existence for an extended period of time (3, 4) even though in some parts of the world, the programme activities tend to decline over time in terms of quality and implementation. These programmes may be structured according to the context of a society, but the principles are similar; they may include the following, but are not limited to them: school feeding programmes; de-worming and micronutrient supplementation; health and nutrition education; school gardens; vaccinations; counselling; physical education; health screening; maintaining a healthy school

environment (1-3, 5).

Poor health in the form of malnutrition, micronutrient deficiency conditions, or helminth (worm) infections contribute significantly to low educational attainment in many low-income countries (3). However, through SHN interventions, schools offer many opportunities to create an environment where learners can acquire health and nutrition knowledge, eat healthily, and engage in regular intense physical activity. This helps support good health and results in positive educational outcomes. Wei and colleagues conducted a case-control study in Lusaka, Zambia, where they observed a 38% reduction in self-reported acute illnesses among learners due to certain interventions, such as training teachers on delivering health lessons, administration of vitamin A, and deworming medication biannually (6). Studies that evaluated school feeding programmes in Jamaica found that serving

standard school meals improved arithmetic scores and school attendance. Additionally, when severely malnourished, stunted, or wasted learners did not have breakfast, their performance deteriorated in various cognitive tests (7, 8). SHN programmes have also proven to be effective in addressing childhood obesity (9, 10), which is now a global issue (11).

### *1.1. Development and Overview of the School Health and Nutrition (SHN) Programmes in Zambia*

In Zambia, SHN programmes have been in existence since 1964, when the Ministry of Health (MOH) provided learners with services like physical examination, inspection of immunizations scars, and micronutrient supplementation (12). Unfortunately, some of these services ceased after a while. Since then, there have been different donor organisations that provide SHN services in various schools (13, 14). However, continuity of these programmes once donor funding is discontinued is not always certain. In 2001, the Ministry of Education (MOE) and the Ministry of Health (MOH) signed an agreement to revive the SHN programmes in Zambia, due to the increasing number of learners suffering from malnutrition, malaria, micronutrient deficiency, and helminth infestation. This agenda was funded by USAID through the Community Health and Nutrition Gender and Educational Support (CHANGES) programme. Various health- and nutrition-related activities were formulated and piloted from 2001 to 2003 (15, 16). Concurrently, several other activities, like sensitizing communities and government officials, training teachers and health workers on SHN, as well as developing training manuals were done. In 2003, the SHN programme was made mandatory in all the state primary schools (grades 1 to 7) in Zambia. The selected teachers were trained and appointed as SHN coordinators, to ensure that the programme is well implemented in the schools. In 2004, the MOE with the help of CHANGES drafted the National School Health and Nutrition policy for the county, which was presented in 2006 (12). CHANGES programme ended in 2005, but the MOE continued with the programme in all the state schools. In 2006, USAID introduced CHANGES2, a phase two of the CHANGES programme. During this period, the activities and development of new training manuals were in progress (17).

Despite the declaration of having a SHN

programme in all schools in 2003, there have been indications of its discontinuation. Currently, there is no information on the extent of SHN implementation in these schools. In addition, Zambia still faces certain challenges associated with malnutrition and high helminth infection among children (18-21). Therefore, the present research aimed to explore the implementation of SHN programme in state (government) schools in Zambia as this programme is vital in addressing some of the health and nutrition challenges faced by learners.

## **2. Methods**

This was a descriptive, cross-sectional study, with a sample of 40 state schools in Lusaka district. Lusaka district was selected purposefully due to logistical issues. Stratified sampling was utilized for obtaining the sample, within the two strata of urban and peri-urban schools. Probability proportional to size sampling was used to determine the inclusion of 16 urban and 24 peri-urban schools. This sampling method ensured external validity within state schools in Lusaka district. Each school has one SHN coordinator, meaning 40 SHN coordinators participated in this study. The schools outside Lusaka district or not administered by the state (community and privately owned schools) were not included. A self-administered questionnaire was used for data collection with 29 questions, a combination of open- and closed-ended questions. The 13 closed-ended ones included questions on demographics and if the school had an active SHN programme. Meanwhile, the 16 open-ended ones asked the participants to list the activities implemented under the SHN programme, state their understanding of the SHN programme, and state the positive outcomes observed and the challenges faced by the school in implementing the programme. Three SHN programme experts from the MOE of Zambia participated in the face and content validation of the questionnaire; there was universal agreement among the experts on the relevancy of all the questions included in the questionnaire.

Once permission was granted by the MOE, a pilot study was conducted at two schools selected from the study sample. Thereafter, the study commenced in the schools. The period of data collection was from July 20, 2015 to 2 August, 2015. Microsoft Excel and Stata statistical programmes

were utilized respectively for data capturing and data analysis. To present the quantitative data, descriptive statistics were employed. The chi-square t-test was used to determine if there was a significant difference in the implementation of the SHN programme between schools in urban and peri-urban areas. This was necessary because the schools in peri-urban areas have more vulnerable children than those in urban areas. The answers provided by open-ended questions were captured verbatim in a word document and subjected to manual content analysis. Segments of the text were highlighted and coded headings were assigned, main themes were then established around the key concepts explored in the questionnaire.

### 2.1. Human Subjects Approval Statement

This study was approved by the Health Research Ethics Committee of Stellenbosch University [Reference number S14/10/251]. Moreover, the MOE of Zambia and the participating schools approved the present work. Participation was voluntary and the participants had to give their consent. No names appeared on the questionnaire or reports to ensure the confidentiality and anonymity of participants in this study.

## 3. Results

### 3.1. Background Characteristics of the Participants

The study participants included 40 SHN coordinators from 40 state schools in Lusaka district, Zambia. Out of this population, 16 were from the urban areas while 24 were from the peri-urban areas. The participants were mostly female (n=28; 70%) and were over 30 years old (n=39; 97.5%). The majority either obtained a diploma

(n=17; 42.5%) or a degree (n=15; 37.5%), with over half of them having between 5 and 10 years (n=22; 55%) of teaching experience (Table 1). Generally, SHN coordinators are required to undergo a 5-day training in SHN programme implementation upon appointment; only 25 (62%) participants however indicated to have done this training. The training sessions were offered between 2004 and 2009.

### 3.2. Participants' Understanding of the SHN Programme

The participating SHN coordinators provided various descriptions of their understanding and the intended purpose of the SHN programme. The most prominent descriptions were that SHN is a programme embarked upon by the MOE, aiming to improve school enrolment and attendance. Moreover, according to them, this programme is applicable to help learners, especially the most vulnerable ones, attain good health. This was to be achieved through some activities, like the school feeding programme (providing learners with foods like soya porridge), deworming, and educating the learners on their health and well-being. One participant stated the following:

*"This is a programme that encourages pupils to live in a healthy environment. It ensures that they have healthy bodies by eating the right kinds of foods. Through this programme, they will be free from diseases, such as bilharzia, anaemia, and worms, resulting in their full participation in school activities. A healthy mind will produce good results."*

### 3.3. Existence of School Health and Nutrition Programme in the Schools

Less than half (n=17; 42.5%) of the responding

**Table 1:** Demographic characteristics of the participants

Demographic Characteristics	Frequency (N=40)	Percent (%)	
Gender	Female	28	70
	Male	12	30
Age (in years)	20-30	1	2.5
	31-40	22	55
	41-50	17	42.5
Education Status	Degree	15	37.5
	Diploma	17	42.5
	Certificate	8	20
Teaching Experience (in years)	Below 5	12	30
	5-10	22	55
	Above 10	6	15

schools had an SHN programme in place. A large percentage of the schools located in both peri-urban (n=13; 54.3%) and urban areas (n=10; 62.5%) stated that they did not have an active SHN programme. The difference in SHN implementation between the urban and peri-urban schools was not statistically significant (P=0.601). Table 2 represents various activities implemented as reported by the schools (n=17) against the activities specified by the MOE (16).

**Table 2:** Activities specified by Ministry of Education in various domains against the activities implemented in the schools as indicated by the School Health and Nutrition (SHN) coordinators

Guidelines for School Health and Nutrition Programme activities as provided by the Ministry of Education Zambia {16}.	Activities implemented under the School Health and Nutrition program in participating schools as reported by the participants (Number of schools implementing the activity)
<b>Domain: Health</b>	
To promote the health status of learners, the schools are required to carry out the following activities:	
Vaccinations: The School and Health facility should during Grade I enrolment, check under-five clinic cards for vaccinations received and ensure that all school children entering Grade I receive Tetanus vaccine (T.T), measles and other vaccination recommended by the MOH. Vaccinate all girls above 15 years with T.T.	Vaccinations: Children are vaccinated against measles, some types of cancers, and other vaccinations during mass vaccination conducted by the Ministry of Health. [n=40].
Physical Examination: Class teachers shall be required to carry out a basic (head to toe) physical examination of all the learners before they enter the classroom to ascertain their hygiene; and their health status. The School shall also arrange for a health worker to screen the learners at least once a year.	Physical Examination: Physical check-ups are not conducted [n=16].
Treatment and Referrals: The School should have a sick bay and ensure that basic medicine to treat minor illnesses are available and teachers are trained in their use. De-worm all children at least once a year with appropriate medication according to prevailing medical guidelines and ensure that trained teachers administer the deworming drugs under the supervision of the trained Health personnel	Treatment and Referrals: The schools in conjunction with health personnel conduct deworming [n=40]. Drug administration for minor ailments are conducted by teachers, [n=17].
Environmental Health and Sanitation: the school should ensure a Regular supply of safe and clean drinking water, Adequate and clean sanitary and handwashing facilities that are gender-friendly and well sited. Regular inspection of surroundings, structures and facilities and regular maintenance. Collaboration with health personnel for guidance on environmental health issues and sanitation	Environmental Health and Sanitation: The teacher on duty inspects the school surroundings and ensures that the toilets and premises are kept clean and conducive for learning daily. [n=17].
Sexual and Reproductive Health: Learners are taught about growth and development in terms of sexuality and reproduction; Learners are made to understand the risks of initiating sex at an early age and their consequences i.e. teenage pregnancies, STIs/HIV/AIDS. Sexual harassment and abuse (physical and verbal) are explained and discouraged	Sexual and Reproductive Health: Learners are subjected to health education focusing on teenage pregnancies, Sexually Transmitted Infections and HIV/AIDS. [n=17].
Substance abuse, the school should ensure that: Information on the dangers of substance abuse is provided to discourage the practice, Learners consuming substances of dependence are referred to rehabilitation services.	Substance abuse: Learners are subjected to health education on substance abuse. [n=17].
Health Promotion: the school shall ensure that high standards of personal and environmental hygiene are observed at all times, Health checks are carried out regularly, and encourage activities that contribute to health promotion, for example, drama and festivals	Health Promotion: Learners are subjected to regular health talks on good health habits, personal hygiene, oral health, hand washing and keeping the school surroundings clean. Learners also educate one another on health issues through drama, poetry, songs and dance regularly. Schools do this once a week at parades or assemblies. [n=17].
<b>Domain: Nutrition</b>	
To promote the nutrition status of learners, the schools are required to carry out the following activities:	
Growth monitoring and promotion: In collaboration with Health centers, the schools should conduct regular weighing and height measuring of all learners at least twice a year. In order to monitor and promote the growth and development of learners in relation to given standards	Growth monitoring and promotion: Growth monitoring is not done. [n=17].
Micronutrient Supplementation: Supplementation of learners with Vitamin A capsules once a year and supplementation of learners with iron tablets as per schedule.	Micronutrient Supplementation: The schools in conjunction with health personnel conduct vitamin A supplementation occasionally [n=40].

<p>Food Production Units (Home Grown School Feeding Programme) In collaboration with communities and other stakeholders, schools shall teach children improved food production methods and agricultural entrepreneurship skills, encourage the growing of seasonal crops and the preservation of foods such as drying mangoes, vegetables, and sweet potatoes, ensure that all learners benefit from the agricultural Production Unit products and demonstrate sustainable agricultural methods and crop diversity</p>	<p>Food Production Units (Home Grown School Feeding Programme): Schools have put up gardens where they grow different types of crops and orchards for fruits. The produce is either sold and the money used to buy food to feed the learners (done occasionally) or they produce mostly the fruits and maize (corn) to benefit the learners. However, gardening is seasonal due to reliance on rain as a source of water. The produce is also limited especially from the gardens due to limited manpower, hence these gardens cannot sustain the feeding program [n=17].</p>
--	---

<p>Improving feeding and eating practices: Schools should have a tuck-shop, which should be selling healthy foods, encourage the family to prepare and pack healthy foods for learners, support the introduction of community-based feeding schemes, ensure that food handlers within school premises are medically fit and practice personal hygiene and ensure that all vendors are oriented on hygiene and sanitation so that foods sold in school are appropriately prepared, packaged and stored. Schools should ensure that learners are advised and counselled on good feeding practices and encourage consumption of traditional and local foods</p>	<p>Improving feeding and eating practices: Schools have tuck shops and vendors, however, there are no policies to guide the vendors on what foods should be sold on the school premises. Hence schools are not stocked with healthy foods but with high salt and high energy foods (crisps and fritters) [n=17]. Children are taught the basics of nutrition and encouraged to consume traditional and local foods. They are also taught how to prepare these foods in home economics subject. [n=17].</p>
--	--

**Domain: Health and Nutrition Education**

In order to promote the health and nutrition knowledge of learners, the schools should carry out the following activities:

<p>Revitalize the Child to Child methodology to disseminate health and nutrition information. Apply the integrated method of teaching SHN issues as identified in the curriculum framework document. Teach basic health and nutrition principles healthy eating habits to avoid becoming under or overnourished and importance of personal hygiene and good grooming. Initiate nutrition clubs in schools and communities.</p>	<p>The curriculum now has a subject where learners are taught basic principles of nutrition, how to prepare nutritious meals (from local foods) and other health and nutrition-related topics. [n=40]. Learners educate one another on health issues through drama, poetry, songs and dance regularly. [n=17].</p>
--	--

**Domain: Recordkeeping**

<p>Record keeping is cardinal in monitoring the health and nutrition status of learners. Schools are required to keep health and nutrition records of all learners. It is important that: The information is in standard form (SHN Card) the information is written. the SHN card is kept for all school grades (one to twelve) and all the required vital statistics on the school health record for all the learners are filled in and updated as necessary</p>	<p>The schools ONLY keep records on when mass activities like vitamin A and deworming are conducted by MOH popularly referred to as drug administration day and not for individual learners. [n=17].</p>
---	--

**Domain: Life skills**

<p>Life skills are abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life. It helps children to acquire and practice good health behaviours along with the underlying knowledge and positive attitudes. The school shall ensure that learners are equipped with psychosocial, practical, vocational and entrepreneurship life skills</p>	<p>learners are taught meal preparation and acquire gardening skills from helping out in the school garden. The learners are also equipped with other crafts skills. [n=17].</p>
--	--

**Domain: Guidance and counselling services**

<p>The school should ensure that provision of Guidance and Counselling services are done by trained staff, therefore Schools should have trained teachers in Guidance and Counselling. Provision of Guidance and Counselling Services in a school should take into account issues of reproductive. health, dangers of Sexually Transmitted Infections, HIV/AIDS, substance abuse and other issues that may have a bearing on the health and nutrition status of learners.</p>	<p>Each school has appointed a guidance and counselling teacher. [n= 17].</p>
---	---

17 out of the 40 participating schools indicated that they had an active SHN programme, however, it is important to note that activities such as the home economics subject and the activities provided by MOH (deworming, and Vitamin A supplementation) are universal to all schools including those with no active SHN programme

It was evident from the information reported by the schools that there was no consistency in the implementation of the SHN activities and not all the activities specified in the MOE guidelines were implemented. Among the activities implemented, there was micronutrient supplementation mainly for vitamin A and deworming, but not consistently. These activities are done in collaboration with

the health care professionals from the health centres nearby. The health and nutrition education programme was reportedly well implemented. As reported by the participants, in 2014, modifications were done to the school curriculum by including Home Economics for primary school students as a subject. This subject includes lessons in food and nutrition, health education, and life skills, which are taught from the first to seventh grades. Physical education is also included in the school curriculum, during which children engage in outdoor exercises once a week.

Despite efforts by schools, there are still other important activities not implemented, like the feeding programme. Food is often given to students under special circumstances and in case of incidences, such as when a child collapses in class due to hunger. Schools also have school gardens; however, most of the gardening is seasonal because of reliance on rain as the source of water as well as the lack of human capacity (“manpower”) since the gardening is mostly done by learners after their class. Physical examination of learners for early detection of health warning signs or ailments (hearing, vision, malnutrition), if any was not done by teachers because the learners are too many in one class. On average, a class has 80 children and one teacher could not manage to physically examine each child and keep up with teaching responsibilities at the same time. Record keeping and documentation of SHN activities was also poor in all the schools. A participant reported that when SHN programme was introduced, every child had a SHN card. This card was used for recording physical examination results, medication, supplements, and vaccines the child had received since they enrolled in grade one until their seventh grade. This card was very helpful for presenting part of the medical history of the child and keeping track of when the child received micronutrient supplements and deworming. Unfortunately, this is no longer done.

### 3.4. Challenges in Implementation of School Health and Nutrition Programme

All the participants (n=40) indicated that insufficient funds and resources along with shortage of human capacity were the main reasons behind the non-existence or poor implementation of SHN programme in the schools. The schools normally receive a lump sum of money from the MOE, allocated to various activities for running

the schools, including school administration and SHN programme. Several schools gave an example of where they were only able to allocate 6 USD (100ZMK), quarterly to the programme (in 2015). Furthermore, the MOE is not training as many SHN coordinators since 2009, this has led to a shortage of SHN coordinators in the schools and has contributed significantly to the poor implementation of the programme. Some activities not requiring money would be implemented if the schools had SHN coordinators. One participant explained the challenges as follows:

*“The programme requires a lot of time, especially during deworming, and it is difficult as I have a class to teach. The programme is voluntary as there is no incentive attached to it, which makes it somehow discouraging. The enrolment is rather too high; it is tiring since the school has about 2,450 pupils.”*

Some schools (n=9; 22,5%) also reported about challenges of water and poor sanitation. These schools did not have a constant supply of water and had few handwashing points and toilets in comparison to the number of their learners.

### 3.5. Positive Changes Attributed to the School Health and Nutrition Programme

Almost all the schools (87.5%; n=15) with an active SHN programme observed positive changes among learners by implementing the programme. They observed an increase in the number of learners attending school regularly. Learners’ concentration in class improved as well as the pass rates. They also reported that the attitude of some learners towards health matters changed as they developed a positive attitude towards their health. Additionally, they acquired some life skills, like gardening. Moreover, they became aware of the negative effects of drug and alcohol abuse and the importance of having or living in a clean environment. Improvement in the learners’ health was evident from the reduction in cases of diarrheal disease. Some parents also reported the same observation to the schools and they thanked the schools for conducting SHN activities. One participant stated:

*“SHN programme helps to provide health education on life skills, hence improving the lifestyles of many Zambians through their school-going children. Schoolchildren are no longer having worms, bilharzia, or diarrhoea. Vitamin A*

*supplementation is also provided which is a very vital programme. A healthy child learns better than a sick child who is often absent due to poor health."*

These positive outcomes were however subjective opinions of the participants because they did not have the baseline data before and after implementation of SHN programme to quantify these positive outcomes. According to the SHN guidelines, schools are required to submit feedback on the progress of the SHN programme to the MOE. Unfortunately, this is not being done regularly, making reference material scarce.

#### 4. Discussion

The current study revealed that the implementation of SHN activities in state schools in Lusaka district has declined in terms of quality and number, especially when compared to the period when the SHN programme was revived in 2001 and shortly after the end of the CHANGES2 programme. This trend is not foreign to many low-income countries, and in most cases, this is attributed to the poor transition from donor funding to self-ownership of the programme, lack of facilities, and insufficient funding from governments (22, 23). The MOE has well-formulated guidelines and activities (16), which if all implemented would significantly alleviate malnutrition among learners. The MOE is also supported by the MOH, the National Food and Nutrition Commission of Zambia (NFNC), and donor partners (UNICEF, USAID, WFP). Nonetheless, there is still a large number of schools not implementing the programme and those implementing the programme are not implementing all its activities.

Malnutrition among children remains a challenge in Zambia; therefore, SHN programmes aim to alleviate malnutrition among learners. According to the most recent Zambia Demographic and Health Survey (ZDHS) in 2018, the prevalence of anaemia ranges from 50% to 70% (18), 22% to 56 % for vitamin A deficiency (19) and 12% to 29% for helminth infection among children (20, 21). Unfortunately, there is limited data on the prevalence of malnutrition among learners in Zambia as most health and nutrition surveys focus on children aged under 5. Nonetheless, the deficiencies children suffer in their earlier years are likely to continue even in their later years if not

addressed. Moreover, surveys done within the region have observed a high prevalence of undernutrition, helminth infection, and micronutrient deficiency among learners (24, 25). Poor health and nutrition status among learners leads to absenteeism and poor classroom performance. Helminth infection, if not treated, can lead to internal blood loss, contributing to anaemia and undernutrition due to increased malabsorption of nutrients. Therefore, worm infected children can become physically and cognitively impaired, which can eventually affect their educational performance and school attendance (26). Iron deficiency causes poor brain myelination; such changes produce deficits in memory, learning capacity, and motor skills among learners (27, 28). Vitamin A deficiency diminishes the ability of the body to fight infections and increases the risk of respiratory and diarrheal infections among learners (1, 29). It is commendable that the MOE, in collaboration with the MOH, conducts deworming and vitamin A supplementation in all the state schools. However, due to the high prevalence of helminth infection, anaemia, and micronutrient deficiency in Zambia, it is important that the MOE increases the frequency of these services to be done consistently at least twice a year. These practices have shown to yield better outcomes (6, 30) and will ensure that more learners are healthy enough to attend school regularly and earn an education.

The school feeding programme is also one of the important activities under SHN programme; however, like most of the low-income countries (31), the school feeding programme in Zambia is only targeted towards the most food-insecure regions instead of being universally available. Some schools in rural Zambia have some form of feeding programmes while those in urban areas do not have access to this service. Since 2006 (12, 32), the school feeding programme has been included in the national budget; still, this does not ensure that all the children in both rural and urban areas are provided with at least one meal per day. According to the 2021 budget, the government plans to roll out homegrown school feeding (32). When implemented, this will improve school feeding programmes because home-grown school feeding has proven to be more sustainable, resulting in a significantly higher meal provision and more variety along with higher quality of school meals compared to cash transfers (33, 34).

Zambia is now facing a double burden of malnutrition as well; hence, SHN activities must be balanced to cover both undernutrition and overnutrition among learners (18, 19, 35). Furthermore, to ensure continued health and weight management among learners, policies should be taken concerning the type of food sold in the tuck shops. It was observed in this study that the tuck shops were mostly stocked with junk foods, high in calories, sugar, and salt. Unfortunately, this undermines the efforts of fighting children overweight and obesity which is rapidly growing in Zambia. Studies have found an association between the type of food sold in school tuck shops and higher intakes of total calories and saturated fat, as well as lower intakes of key nutrients (36, 37).

#### 4.1. Implications for SHN Programme

Financial constraints and lack of human capacity were reported as the main reasons for the sub-optimal implementation of some of the SHN activities. Primary schools have a free education policy; therefore, funding has to be sourced externally. Additionally, inconsistency in the monitoring and evaluation of SHN programme by the MOE has contributed to its poor implementation in schools. Government, as the custodian, should take note of the positive impact of SHN programmes not only on the health of learners but also on the nation at large. SHN programmes ensure that learners are healthy and earn an education. Basic education is one of the most effective investments in improving economies and creating literate, self-reliant, and healthy societies (5, 38). Unfortunately, government has been reducing the budget allocation to the Education sector since 2015. This also means a reduction in budget allocation to SHN programme as it resorts under the MOE budget. Partners like WFP, UNICEF, and USAID should be commended for their support in SHN activities, particularly the feeding programme and training of teachers; nevertheless, the support is limited to a certain period and location. SHN programmes are more effective if there is consistency and continuation. Emphasis should also be put on routine monitoring for effective coverage and evaluation of the impact of the interventions as this is an integral part of SHN programme. More sustainable methods should also be explored to ensure SHN programme continuity in schools.

#### 4.2. Limitations

This survey was self-funded and due to time limitations, it was only possible to conduct the study in one district. The findings can therefore not be generalized countrywide.

#### 5. Conclusion

At the time of this study, over half of the responding schools in Lusaka district did not have a SHN programme in place. However, SHN programme coordinators were found to be knowledgeable about it and could well articulate its importance. The schools implementing the programme were not implementing all the recommended activities outlined in the SHN guideline handbook provided by the MOE. The schools not implementing this programme reported that it was mainly due to lack of funds, resources, human capacity, on top of inconsistency by the MOE in following up with the schools to ensure that they are implementing the programme. Despite the challenges, the participants indicated that SHN programme had reportedly produced positive results reflected in the reduction of illnesses among the children and improvement in school attendance and pass rate.

#### Acknowledgement

The authors would like to thank the schools and staff of Ministry of Education who participated in the study.

#### Ethical Approval

This study was approved by the Health Research Ethics Committee of Stellenbosch University [Reference number S14/10/251]. Moreover, participation was voluntary and the participants had to give their consent.

**Conflicts of interest:** None declared.

#### References

1. Bundy D, Shaeffer S, Jukes M, Beegle K, Gillespie A, Drake L, et al. School-based Health and Nutrition Programs. In Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, editors. *Disease Control Priorities in Developing Countries*. 2nd ed. Oxford University Press; New York; 2006.



2. Michael SL, Merlo CL, Basch CE, Wentzel KR, Wechsler H. Critical connections: health and academics. *J Sch Health*. 2015;85(11):740-58. doi: 10.1111/josh.12309. PubMed PMID: 26440816; PubMed Central PMCID: PMC4606776.
3. Tomlinson M. School feeding in east and southern Africa: Improving food sovereignty or photo opportunity? 7th ed. EQUINET; 2007.
4. Institute of Medicine Committee on Comprehensive School Health Programs in Grades K. In: Allensworth D, Lawson E, Nicholson L, Wyche J, editors. *Schools & Health: Our Nation's Investment*. Washington (DC); National Academies Press; 1997. doi:10.17226/5153. PubMed PMID: 25121262.
5. World Food Program, UNICEF. The essential package, the twelve interventions to improve the health and nutrition of school-age children; World Food Program, UNICEF. 2015.
6. Wei D, Brigell R, Khadka A, Perales N, Fink G. Comprehensive school-based health programs to improve child and adolescent health: Evidence from Zambia. *PLoS One*. 2019;14(5):e0217893. doi: 10.1371/journal.pone.0217893. PubMed PMID: 31150484; PubMed Central PMCID: PMC6544295.
7. Simeon DT. School feeding in Jamaica: a review of its evaluation. *Am J Clin Nutr*. 1998;67(4):790S-794S. doi: 10.1093/ajcn/67.4.790S. PubMed PMID: 9537630.
8. Powell CA, Walker SP, Chang SM, Grantham-McGregor SM. Nutrition and education: a randomized trial of the effects of breakfast in rural primary school children. *Am J Clin Nutr*. 1998;68(4):873-9. doi: 10.1093/ajcn/68.4.873. PubMed PMID: 9771865.
9. Dabravolskaj J, Montemurro G, Ekwaru JP, Wu XY, Storey K, Campbell S, et al. Effectiveness of school-based health promotion interventions prioritized by stakeholders from health and education sectors: A systematic review and meta-analysis. *Prev Med Rep*. 2020;19:101138. doi: 10.1016/j.pmedr.2020.101138. PubMed PMID: 32612906; PubMed Central PMCID: PMC7322344.
10. In-Iw S, Saetae T, Manaboriboon B. The Effectiveness of School-Based Nutritional Education Program among Obese Adolescents: A Randomized Controlled Study. *Int J Pediatr*. 2012;2012:608920. doi: 10.1155/2012/608920. PubMed PMID: 23118771; PubMed Central PMCID: PMC3483824.
11. World Health Organisation. *Obesity and Overweight*; World Health Organisation; 2021.
12. Ministry of Education Zambia. *National School Health and Nutrition Policy*; Ministry of Education. 2005.
13. Sherman J, Muehlhoff E. Developing a nutrition and health education program for primary schools in Zambia. *J Nutr Educ Behav*. 2007;39(6):335-42. doi: 10.1016/j.jneb.2007.07.011. PubMed PMID: 17996629.
14. Vorley K, Corbett M. *School Feeding Programme in Zambia Field Exchange*; 2005.
15. Basic Education and Policy Support (BEPS). *A healthy child in a healthy school environment; a look at the CHANGES programme in Zambia*; 2004. Contract No. HNE-1-00-00-00038-00 Task Order No. 807.
16. Ministry of Education Zambia. *Guidelines for the implementation of the school health and nutrition program activities*; Ministry of Education Zambia. 2008.
17. Ministry of Education Zambia. *Zambia's Community Health and Nutrition, Gender and Education Support-2 Program (CHANGES2)*. American Institutes for Research; 2009.
18. Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF. *Zambia Demographic and Health Survey 2018*. Lusaka, Zambia, and Rockville, Maryland, USA: Zambia Statistics Agency, Ministry of Health, and ICF; 2019.
19. Hotz C, Chileshe J, Siamusantu W, Palaniappan U, Kafwembe E. Vitamin A intake and infection are associated with plasma retinol among pre-school children in rural Zambia. *Public Health Nutr*. 2012;15(9):1688-96. doi: 10.1017/s1368980012000924. PubMed PMID: 22443986.
20. Siwila J, Olsen A. Risk Factors for Infection with Soil Transmitted Helminths, *Cryptosporidium* spp., and *Giardia duodenalis* in Children Enrolled in Preschools in Kafue District, Zambia. *Epidemiol Res Int*. 2015;2015(906520). doi: 10.1155/2015/906520.
21. Tembo S, Mubita P, Sitali L, Zgambo J. Prevalence, Intensity, and Factors Associated with Soil-Transmitted Helminths Infection among Children in Zambia: A Cross-sectional Study. *Open Public Health Journal*. 2019;12(1):284-293. doi: 10.2174/1874944501912010284.
22. Shrestha RM, Ghimire M, Shakya P, Ayer R, Dhital R, Jimba M. School health and nutrition program implementation, impact, and challenges in schools of Nepal: stakeholders' perceptions. *Trop Med Health*. 2019;47:32. doi: 10.1186/s41182-019-0159-4. PubMed PMID: 31114429; PubMed Central PMCID: PMC6515607.
23. Oluwakemi MA, Kayode OO, Taiwo AO. *A Qualitative Study on Status of Implementation*

- of School Health Programme in South Western Nigeria: Implications for Healthy Living of School Age Children in Developing Countries. *American Journal Education Resources*. 2014;2(11):1076-1087. doi: 10.12691/education-2-11-12.
24. Best C, Neufingerl N, van Geel L, van den Briel T, Osendarp S. The nutritional status of school-aged children: why should we care? *Food Nutr Bull*. 2010;31(3):400-17. doi: 10.1177/156482651003100303. PubMed PMID: 20973461.
  25. Mwaniki EW, Makokha AN. Nutrition status and associated factors among children in public primary schools in Dagoretti, Nairobi, Kenya. *Afr Health Sci*. 2013;13(1):39-46. doi: 10.4314/ahs.v13i1.6. PubMed PMID: 23658566; PubMed Central PMCID: PMC3645091.
  26. Hotez PJ, Bundy DAP, Beegle K, Brooker S, Drake L, de Silva N, et al. Helminth Infections: Soil-transmitted Helminth Infections and Schistosomiasis. In Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, editors. *Disease Control Priorities in Developing Countries*. Oxford University Press; 2006.
  27. Gebreyesus SH, Endris BS, Beyene GT, Farah AM, Elias F, Bekele HN. Anaemia among adolescent girls in three districts in Ethiopia. *BMC Public Health*. 2019;19(1):92. doi: 10.1186/s12889-019-6422-0. PubMed PMID: 30665390; PubMed Central PMCID: PMC6341533.
  28. Kim J, Wessling-Resnick M. Iron and mechanisms of emotional behavior. *J Nutr Biochem*. 2014;25(11):1101-1107. doi: 10.1016/j.jnutbio.2014.07.003. PubMed PMID: 25154570; PubMed Central PMCID: PMC4253901.
  29. Katona P, Katona-Apte J. The interaction between nutrition and infection. *Clin Infect Dis*. 2008;46(10):1582-8. doi: 10.1086/587658. PubMed PMID: 18419494.
  30. World Health Organisation. Preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups Guideline World Food Program. 2017. ISBN: 978 92 4 155011 6
  31. World Food Program. State of School Feeding Worldwide; World Food Program. 2013.
  32. Ministry of Finance and National planning Zambia. 2021 National budget Report . Department of National planning. Zambia; 2020.
  33. Shrestha RM, Schreinemachers P, Nyangmi MG, Sah M, Phuong J, Manandhar S, et al. Home-grown school feeding: assessment of a pilot program in Nepal. *BMC Public Health*. 2020;20(1):28. doi: 10.1186/s12889-019-8143-9. PubMed PMID: 31914980; PubMed Central PMCID: PMC6950908.
  34. Food Agriculture Organisation, World Food Program. Home-Grown School Feeding. Resource Framework. Synopsis. Rome, 2018. 36 pp.
  35. Chirwa U, Musuku J, Pandey VK. Prevalence of Obesity and Associated Risk Factors Among School Children in Primary Schools in Lusaka, Zambia. *Medical Journal of Zambia*. 2019;46(2):90-99.
  36. Story M, Nannery MS, Schwartz MB. Schools and obesity prevention: creating school environments and policies to promote healthy eating and physical activity. *Milbank Q*. 2009;87(1):71-100. doi: 10.1111/j.1468-0009.2009.00548.x. PubMed PMID: 19298416; PubMed Central PMCID: PMC2879179.
  37. Hood NE, Colabianchi N, Terry-McElrath YM, O'Malley PM, Johnston LD. School wellness policies and foods and beverages available in schools. *Am J Prev Med*. 2013;45(2):143-9. doi: 10.1016/j.amepre.2013.03.015. PubMed PMID: 23867020.
  38. Ozturk I. The Role of Education in Economic Development: A Theoretical Perspective. *Journal of Rural Development and Administration*. 2001;33(1):39-47.