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Evaluating the South African national school nutrition programme guidelines: Insights on general guidelines and provisions for school holidays

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Abstract
In this article we assess the guidelines on nutrition practices during school holidays by the South African national school nutrition programme (NSNP) for secondary schools. Guided by the theoretical health belief model (HBM) we consider the lack of specific guidance on holidays as part of the major challenges of conducting behaviour-conducive health guidelines. Specific recommendations arise from document analysis and a literature review of the various sections of the guidelines: extending guidance around school holidays, promoting flexible implementation, continued training, embedding a food safety culture, stakeholder engagement, and strong monitoring. We also put the importance of the South African NSNP guidelines in perspective and suggest some strategies on how these guidelines could overcome the challenges to bring about more effective and healthier school food environments for South African learners.

Keywords: guidelines; health belief model; nutritional practices; school holidays; secondary school; South African national school nutrition programme

Introduction
The role of nutrition in school performance has been greatly acknowledged in the modern-day learning environment (Devereux, Hochfeld, Karriem, Mensah, Morahanye, Msimango, Mukubonda, Naicker, Nkomo, Sanders & Sanousi, 2018; Zenebe, Gebremedhin, Henry & Regassa, 2018). In this regard, most countries have comprehensive school nutrition programmes that recognise that rounded diets are important determinants of cognitive development and general well-being, which have been confirmed in the writings of Banda (2021) and Feldman, Veiros and McGill (2018). One of these programmes is the South African national school nutrition programme (NSNP), which is vital in ensuring that learners receive appropriate, healthy, and balanced school meals.

School nutrition programmes such as the NSNP are important because they have great potential to fill the gap between academic progress and overall health (Irmak, 2021). Teenagers undergo rapid growth and development; hence, a healthy diet is among the key basic needs for physical and mental development (Samodien, Abrahams, Muller, Louw & Chellan, 2021; Zenebe et al., 2018). The South African NSNP is a crucial initiative that provides learners with wholesome meals while at school, aligning with the global efforts of many nations, such as school feeding programmes supported by the World Food Programme (WFP) and initiatives highlighted by the Food and Agricultural Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the WFP and the World Health Organization (WHO) (2020), aimed at addressing child malnutrition and improving educational outcomes (Zenebe et al., 2018). These efforts include international programmes focused on enhancing access to nutritious meals in schools to support cognitive development, academic achievement, and general well-being. The South African NSNP is governed by a thorough set of regulations to address nutritional deficiencies and to promote health-conscious dietary behaviour (Department of Education [DoE], 2009). These recommendations cover various nutrition-related topics, such as menu planning, ingredient sourcing, meal preparation, hygienic requirements, and nutritional education (DoE, 2009).

Despite the critical role of the South African NSNP in promoting healthy eating among learners, there is a significant lack of guidance regarding nutritional practices during school holidays, potentially undermining the programme's overall effectiveness (Pitseng, 2016). As such, with this article we aim to evaluate the NSNP guidelines and provisions for school holidays. The objectives of the study were as follows:

1) To analyse the existing South African NSNP guidelines regarding learner's meal provisions during school holidays.
2) To suggest recommendations for improving the NSNP guidelines during school holidays.

Literature Review
Success regarding school nutrition programmes, whether related to their implementation or the impact that such programmes have on academic achievement and nutritional results, is the focus of extensive worldwide and local discussion. Reyneke (2020) posits that South Africa has made noteworthy progress in upholding children's

constitutional rights to education and food. According to Govender, Subban and Wessels (2021), the South African NSNP is designed to implement constitutional rights. Although the programme has demonstrated a significant effect in augmenting school enrolment and attendance, concerns have been raised regarding its implementation. Pitseng (2016) specifically highlights challenges during school holiday periods, where the programme's reach may be limited.

Other studies (Gresse, Nomvete & Walter, 2017; Mensah & Karriem, 2021; Tshisikhawe, 2017) have uncovered several intricacies about the prevalence of malnutrition among school-aged children and the adequacy of the South African NSNP in addressing these concerns. Additionally, Knipe (2022) contemplates the sufficiency of the implementation of the South African NSNP, specifically regarding secondary schools and providing guidance during holiday periods. Sanousi (2019) attests that the South African NSNP has not yet received rigorous evaluations.

While the primary goal with the South African NSNP is to provide nutritious meals that promote learners' optimal health and well-being, ongoing research and evaluation focus on ensuring the programme's effectiveness in meeting these objectives. However, Devereux et al. (2018) concur that the South African NSNP has yet to be subjected to a thorough impact evaluation, partly due to methodological issues. While the South African NSNP employs food handlers, often mothers from the school communities, providing them with income, and evaluates the nutritional value of recipes to ensure balanced meals, there remains a need for a thorough review of how effectively these initiatives are implemented in practice (Devereux et al., 2018). Despite regular evaluation and review of the South African NSNP there appears to be no such study that uses rigorous efficacy assessment (Graham, Hochfeld, Stuart & Van Gent, 2015).

Hazell, Mawoyo, Jack, Shindler, Rddi, Marera, Mugo, Petersen, Morake, Wenhold, Schonfeldt, Balchin and Roscani (2016) generally agree that major operational constraints hamper the programme's success. In the first decade of the South African NSNP, school meals often failed to meet the nutritional criteria set by the Department of Health. These issues were linked to structural issues like inadequate supply chain management, lack of employees, contracting inconsistencies, and inadequate school infrastructure for food storage and preparation (Hazell et al., 2016; Sanousi, 2019). Other issues include food quality and quantity, a targeting mechanism (the quintile system) that excluded some impoverished learners from receiving South African NSNP meals, and food gardens that were too small and inadequately maintained to produce enough food (Gresse et al., 2017; Mulaudzi, Reyneke & Gcelu, 2024).

Theoretical Framework

We used the health belief model (HBM), a widely used health and nutrition research theory, to evaluate the implementation of secondary school nutrition guidelines. HBM, first proposed by social psychologists, Godfrey Hochbaum, Irwin Rosenstock, Rosenstock, and Kirscht in the 1950s, aims to explain and predict health-related behaviour based on individuals' perceptions and beliefs about health risks and benefits (Boskey, 2024).

The HBM predicts health behaviour based on thought patterns consisting of three categories: individual perceptions, modifying factors, and the likelihood of action. Individual perception, including health value, perceived susceptibility, and perceived severity, influences how people perceive illness. Moderating factors include demographic factors, perceived threats, and action cues. The likelihood of action is determined by the perceived benefits minus the perceived difficulties in implementing health actions. Demographic factors, perceived threats, and action cues also shape health behaviour. At least three factors influence the perception of a threat to personal health behaviour: general health values, specific health beliefs about vulnerability to a particular health threat, and beliefs about the effects of the health problem. People are more likely to take preventive health action if they perceive a threat, are repeatedly prompted to act, and believe that the benefits outweigh the risks (Boskey, 2024; Etheridge, Sinyard & Brindle, 2023; McKellar & Sillence, 2020; Rosenstock, Strecher & Becker, 1988).

With this study we explored the impact of perceived susceptibility and severity on schools' adherence to nutrition guidelines. The study reveals that schools' perceptions of the risks associated with poor nutrition directly influenced their willingness to adopt these guidelines. The perceived benefits and barriers framework suggests that schools' decisions to follow nutritional guidelines are influenced by their perception of the benefits versus potential obstacles. External factors like resource availability, support by the Department of Education, and awareness campaigns can motivate schools to implement nutritional guidelines effectively. Self-efficacy is vital for successful implementation and sustainability.

Methodology

Constructivism was used as paradigm in the study reported on here. Constructivism aims to understand ways in which people construct knowledge and meaning from their experiences and how they interact and interpret the world around

them (Perera, 2018; Romani, Barmeyer, Primecz & Pilhofer, 2018). In this study, constructivism assisted in evaluating the South African NSNP guidelines and provisions for school holidays. A qualitative approach was used to understand the subjective interpretations within the NSNP guidelines and its practices. This approach was useful for this study as these subjective interpretations cannot be understood using numbers or quantitative data.

In this article we use different materials, such as scholarly literature, the South African NSNP guidelines and reports on the NSNP from government and non-governmental organisations (Myers, 2019; Snyder, 2019). These documents were selected purposively (Myers, 2019), ensuring their relevance to the South African NSNP. The literature used was retrieved from various databases, including the Department of Basic Education (DBE) official website, Kovsie Cat, University of the Free State Database (Kovsie Scholar), Google Scholar, and Semantics. In addition, the documents mentioned were analysed using thematic content analysis (Lochmiller, 2021; Myers, 2019).

The data collection was informed by specific search words like "national school nutrition programme", "school meals", "school nutrition", "feeding schemes", and "school holidays." The selection of documents was based on relevance to the research purpose and credibility of the sources. The data analysis involved a critical reading of the relevant documents. Each document was subjected to a rigorous review process through which relevant data were systematically retrieved and recorded.

The results were put together to give a clear indication of how the South African NSNP offers general guidelines and provisions for school holidays. Although no primary data were used (as there were no human participants), we followed ethical principles and ethical clearance was applied for and awarded (ethical clearance number: UFS-HSD2021/1778/21). All documents were used carefully, adhering to academic rules such as avoiding plagiarism, and attention to detail in citations and attributions was ensured. We ensured that our writing contained little to no plagiarism; all sources were referenced according to the Havard referencing style. The qualitative approach adopted was important (however, it was the secondary method used) in helping to achieve the research goals, as it allowed for a deep dive into the NSNP guidelines on school holidays.

Findings and Discussions of the Analysis of the National School Nutrition Programme

In this section we discuss the guidelines for the South African NSNP. We focus on the basic principles and their role in ensuring that learners receive proper nutrition during school holidays.

Menu Planning and Nutritional Adequacy

The goal with the South African NSNP is to offer learners with a variety of meals to promote eating habits and support their development (DBE, 2023; DoE, 2009). However, the guidelines lack instructions on support for learners during school holidays, which could hinder the programme's effectiveness in meeting learners' dietary needs beyond school hours. The guidelines provide a blueprint for organising and executing school nutrition initiatives by setting criteria for meal planning standards and education on nutrition (DBE, 2023; DoE, 2009). Schools and the DBE must adhere to these guidelines to guarantee that learners receive nourishing meals that promote their growth and learning achievement effectively. However, the absence of instructions regarding provision of meals during school holidays results in the programme not meeting the learners' nutritional requirements.

Pérez-Escamilla (2017) and Zhao, Chen and Song (2024) concur on the impact of school-based nutrition programmes on the well-being of learners regarding health status improvement and enhancement in attendance and academic performance outcomes. Researchers highlight that these strategies offer an approach to tackling gaps and fostering healthy eating behaviour among children (Wang & Fawzi, 2020; Zhao et al., 2024). On the other hand, critics such as Alderman and Bundy (2012) and Munje and Jita (2019) raise concerns about the limitations and deficiencies in the South African NSNP programme. The South African NSNP is lacking with regard to considering variation and dietary needs, but highlights issues related to food quality assurance such as safety and sustainability (Hazell et al., 2016; Public Service Commission, 2008). Therefore, insufficient guidance regarding school holidays may be regarded as a weakness as the programmes do not continuously provide deserving learners with nutrition.

The HBM theoretical framework suggests various influences on people's health-related behaviour, such as perceived threats, benefits, and barriers (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988). The South African NSNP guidelines highlight perceived benefits such as improved academic performance and health during the school day while addressing barriers to nutrition. In addition, the South African NSNP aims to mitigate the severity of nutritional deficiencies. In contrast, a lack of guidance regarding school holidays indicates a gap, which counteracts the potential perceived benefits of the programme.

Food Sourcing and Quality

The South African NSNP guidelines highlight the sourcing of safe and high-quality food items used for learners' meals as vital (DoE, 2009). In addition to safe and quality food items, the guidelines indicate that schools should prioritise acquiring fresh and locally sourced food items. The aim is to ensure that learners receive safe and nutritious meals (DoE, 2009). Still, no guidelines are provided for how food should be provided during school holidays – a gap in the policy. This means that deserving learners are left without nutritious meals during holidays, and the guidelines are open to various interpretations. In addition, a lack of specific guidance for school holidays may pose challenges in maintaining the same level of quality sourcing.

Borkowski, Ortiz Correa, Bundy, Burbano, Hayashi, Lloyd-Evans, Neitzel and Reuge (2021) and Nomakhushe (2018) agree that the South African NSNP guidelines support the sourcing of food of high quality, as it contributes to learners' overall health and well-being. Public Service Commission (2008) and Zenebe et al. (2018) attest that the schools that have successfully implemented these guidelines have observed positive impacts on learners' nutrition and health. Nilson (2016) indicates that, despite the achievement of the South African NSNP, more challenges still need to be addressed such as financial constraints in sourcing ingredients of high quality, limited availability, or other factors (Hazell et al., 2016). Chatterjee and Nirgude (2024) argue that the above challenges hinder schools from fully applying the guidelines. Furthermore, Washinyira (2020) expresses concern about the lack of explicit guidance on the provision of meals during school holidays.

In terms of the HBM framework, food sourcing and quality align with HBM principles of perceived benefits and cues to action (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988). The aim is to provide learners with the benefits of consuming safe, high-quality food that promotes their health and well-being. In addition, the guidelines also prompt schools to take action to ensure learners' access to nutritious food. However, the lack of specific guidance on school holidays may relate to the perceived barriers in the HBM. This means that schools face challenges to maintain the same level of provision and food quality during holidays, which impacts learners' health and well-being.

Meal Preparation and Hygiene

The South African NSNP guidelines emphasise the importance of maintaining high hygiene standards during meal preparation, handling, and serving. Additionally, detailed guidance is given for safe food preparation, cleaning of utensils and surfaces and ensuring proper cooking temperatures (DoE, 2009). Adherence to these guidelines is crucial for maintaining a hygienic environment during preparation and serving of meals. The guidelines emphasise the importance of preventing foodborne illnesses and contamination.

Schools and the DBE should, therefore, adhere to strict hygiene protocols during regular school hours, but a lack of specific guidance during school holidays may pose challenges in maintaining the same hygiene levels. Sanousi (2019) notes that schools that strictly implemented these guidelines observed fewer instances of foodborne illnesses among learners. In addition, Sibanyoni, Tshabalala and Tabit (2017) highlight that challenges with regard to food safety prevent schools from fully applying the guidelines. Some of the challenges include hygiene consistency due to limited resources, staff training, or other factors (Hazell et al., 2016). Given the absence of specific guidance for school holidays, there might be concerns about the potential gap in maintaining hygienic standards during holidays. This calls for extending guidelines to cover holiday periods.

According to the HBM framework, meal preparation and hygiene guidelines align with the principle of perceived severity, cues to action and perceived barriers (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988). The lack of specific guidance for school holidays might relate to the HBM's perceived barriers due to limited resources, reduced staff presence, and decreased oversight. With regard to cues to action, schools may struggle to uphold the same hygiene standards without guidance and support systems as during regular school hours, which could negatively impact learners' health.

Nutritional Education

The South African NSNP guidelines emphasise incorporating nutritional education into the school curriculum, aiming to promote healthy eating habits and informed dietary choices among learners (DoE, 2009). This suggests that schools should integrate lessons and activities that educate learners regarding benefits of healthy eating, consuming various nutrient-rich foods, and making informed food choices, empowering learners with knowledge and skills to make healthier dietary decisions (DoE, 2009). However, the gap in the policy on preparing and providing meals during school holidays, remains. Incorporating extra classes on nutrition during these periods could have a positive effect by reinforcing healthy eating habits, raising awareness about nutrition, and enabling learners to make informed dietary choices even outside regular school hours. Hands-on activities, or workshops that engage learners in fun, informative ways such as gardening, could be presented. Additionally, utilising existing staff or inviting community nutritionists to lead these sessions may ensure that

learners receive valuable nutritional education without significantly disrupting the holiday period.

Alexander, Matoti and Van Zyl (2021) agree that the South African NSNP supports integrating nutritional education to promote long-term healthy eating habits among learners. Hazell et al. (2016) and Tagoe (2018) highlight challenges that schools face in integrating nutritional education due to time constraints, curriculum limitations, or other factors. Such challenges hinder schools from fully applying the guidelines.

According to the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), the nutritional education guidelines align with the principle of perceived benefits as they aim to provide learners with the benefits of knowledge and skills to make healthier dietary choices for improved health and well-being. The guidelines also challenge schools to take action to educate learners. However, the lack of guidelines for school holiday periods may result in perceived barriers in the HBM. As such, schools might face challenges in providing the same level of nutritional education, impacting learners' access to knowledge and awareness.

Community Engagement

The South African NSNP guidelines emphasise the importance of involving parents, guardians, and the local community in supporting the implementation of the NSNP (DoE, 2009). The guidelines suggest that schools should collaborate with parents and community members to enhance learners' nutritional experiences, encourage healthy eating habits at home, and create a supportive environment for learners' well-being (DoE, 2009). Still, the guidelines do not explicitly address community engagement during school holidays, leaving a gap in providing specific guidance for these periods.

Therefore, for schools and the DBE to involve the community means recognising the role of parents and the community in learners' nutritional well-being, fostering collaboration. The guidelines prescribe that during regular school hours, schools should actively involve parents and the community to support learners' nutritional experiences. However, due to the lack of specific guidance for school holidays, schools and the DBE might face challenges maintaining the same level of community engagement during holidays.

Mawela and Van den Berg (2020) indicate that community engagement is essential in creating a supportive environment for learners' health. They point out that schools that foster collaboration with stakeholders observed positive outcomes in learners' dietary habits and overall well-being. Additionally, Mawela and Van den Berg (2020) indicate the challenges that schools may face in fostering collaboration due to communication barriers, lack of parental involvement, or other factors. Therefore, such challenges hinder schools from fully applying the guidelines. Given the absence of specific guidance for school holidays, concerns arise about the potential gap in maintaining community engagement during holidays.

Based on the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), community engagement aligns with the principle of modifying factors. The authors recognise the influence of the community on learners' health and well-being and aim to leverage this influence for positive dietary outcomes. Regarding cues to action, the guidelines prompt schools to take action to foster collaboration. However, during school holidays, lack of guidance relates to perceived barriers in the HBM.

Frequency and Timing

The South African NSNP guidelines note the importance of the provision of regular and consistent meals for learners. The guidelines indicate that meals should be served by 10:00 to ensure that learners receive adequate nutrition. The guidelines also recommend aligning meal timing with learners' schedules to optimise nutrient absorption and support their energy levels (DoE, 2009). The guidelines do not explicitly address the frequency and timing of meals during school holidays, leaving a gap in providing specific guidance for this period.

The South African NSNP guideline indicates that learners should have at least one meal at school daily (DoE, 2009). As such, most schools provide learners with only one meal, contributing to only 30% of learners' daily nutritional needs. Only two provinces, the Western Cape and Gauteng, provide breakfast and lunch to learners (Esakov & Vally, 2010). The other provinces only provide breakfast before 10:00. For provinces that provide breakfast, there are, and were, no viable referrals by the South African NSNP for the children to social services for supplementary meals. As such, by providing only one meal it is impossible to reach the recommendations of the food-based dietary guidelines (FBDG). According to the South African NSNP, learners should have at least one nutritious meal every day of the school week. Nevertheless, Esakov and Vally (2010) argue that learners should be served two daily meals – breakfast at 7:00 and lunch at 11:00.

The department has set a deadline of 10:00 for schools to serve meals to learners. However, Esakov and Vally (2010) believe that this is too late, as many learners arrive hungry and in need of nutrition to support their learning throughout the day. Many learners are underfed and are hungry when they get to school, so it is crucial that they

have a meal as soon as possible so that they have the energy to learn and participate in activities (Esakov & Vally, 2010). School feeding programmes typically run for a set number of days per year (on average, 180) and have a specified food basket (Hazell et al., 2016).

According to the South African NSNP annual reports, schools fed learners during school days (DBE, 2023; Hazell et al., 2016). Research shows that the South African NSNP typically feeds learners on school days, which translates to approximately 200 days per year, depending on the academic calendar and public holidays (Faber, De Villiers, Hill, Van Jaarsveld, Okeyo & Seekoe, 2019). The above indicates that learners do not receive food on weekends, public holidays, and extended school holidays, as was the case during extended school closures due to the coronavirus disease (COVID-19) lockdown.

Given the absence of specific guidance for school holidays, there might be concerns about the potential gap in maintaining consistent meal frequency and timing during holidays. According to the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), the frequency and timing guidelines align with the principle of perceived benefits.

Food Menus

The South African NSNP guidelines highlight providing nutritious and balanced food to learners during designated school days. The guidelines suggest that schools plan menus that include a variety of nutrient-rich foods to ensure that learners receive adequate nutrition and energy to support their growth and development (DoE, 2009). As indicated earlier, the South African NSNP guidelines do not explicitly address holiday menus, leaving a gap in specific guidance in this regard.

Moliterno, Da Silva, De Meira, Furlan, Dos Santos Brito, Campos, Inácio and De Lima Santos (2024), Muvhango (2016) and Tagoe (2018) agree that the guidelines support the provision of balanced and nutritious holiday menus to improve learners' dietary intake and overall health. In contrast, Hazell et al. (2016), Iddrisu (2018) and Sanousi (2019) highlight challenges that schools face in providing balanced menus due to resource constraints, limited menu planning knowledge, or other factors.

Given the absence of specific guidance for school holidays, concerns arise about the provision of nutritious meals during school holidays. The concerns advocate for extending the guidelines to cover holiday periods or finding innovative ways to maintain food quality during holidays. Based on the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), the holiday menu guidelines should align with the principle of perceived benefits aiming to provide learners with the benefits of consuming nutrient-rich foods for better health and energy levels. Regarding cues to action, the DBE and schools are prompted to take action to plan and provide balanced menus. However, the lack of guidelines on school holiday periods results in perceived barriers in the HBM. Therefore, schools might face challenges in maintaining the same level of food quality during holidays, which could impact learners' nutritional intake and well-being.

Portion Sizes

The South African NSNP guidelines emphasise appropriate portion meal sizes for learners that align with nutritional needs (DoE, 2009). In contrast, while the guidelines do not explicitly emphasise portion sizes, they reference at least meeting 30% of learners' nutritional needs. This approach suggests that the amount of food provided to a school is determined by the number of learners enrolled, which helps avoid excessive portion sizes, prevent overeating, and support learners' health. However, the South African NSNP guidelines do not explicitly address portion sizes during school holidays, leaving a gap in providing specific guidance and room for misinterpretation.

Therefore, adhering to the portion size guidelines means that schools should recognise the importance of serving meals appropriate for learners' nutritional requirements. These guidelines emphasise promoting balanced eating habits and preventing excessive calorie consumption. However, this guidance is only provided for school days. As such, with a lack of specific guidance for school holidays, schools might face challenges in ensuring appropriate portion sizes during holidays.

El Ghoch and Valerio (2020) are concerned that learners from poor backgrounds mostly consume nutritionally inadequate and unbalanced food at home and school. As such, appropriate portion sizes encourage healthy eating behaviour and prevent overconsumption among learners. Mafugu (2021) highlights the challenges that schools face in determining appropriate portion sizes due to variations in learners' needs and preferences. Mafugu (2021) argues that such challenges hinder schools from fully aligning with the guidelines. Rendall-Mkosi, Wenhold and Sibanda (2013) examined the South African NSNP menus and found that the nutritional value of the meals given by the South African NSNP provided learners with roughly 15% of their recommended dietary allowance (RDA) of calories and 26% of their protein requirements. No recipe books that indicate the portions of dry products to be cooked were supplied by the DBE to any of the schools visited in this study, implying that the portions may not be precise. Indeed, as serving progressed, meal sizes shrank, ensuring that all learners received

some food (Hazell et al., 2016; Rendall-Mkosi et al., 2013).

Aliyar, Gelli and Hamdani (2015) examined the nutritional content of school lunches in Ghana, India, Kenya, Mali, Rwanda, and South Africa, comparing them to the WHO-recommended daily amount for learners aged 10 to 14. While iodised salt is required to be included in meals, South Africa only supplies 59% of the RDA of iodine. The South African NSNP also only meets 2% of the vitamin A needs (Hazell et al., 2016). Given the absence of specific guidance for school holidays, schools could advocate for extending guidelines to cover holiday periods or finding practical ways to address portion size challenges.

Regarding the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), the guidelines on protein sizes align with the principle of perceived susceptibility. Susceptibility calls to prevent health risks associated with excessive portion sizes and overeating. Furthermore, the guidelines align with cues to action, prompting schools to take action to serve appropriate portion sizes. However, during school holidays, the lack of specific guidance in the guidelines leads to perceived barriers in the HBM. As such, schools might face challenges in maintaining appropriate portion sizes during holidays, which could impact learners' eating behaviour and health.

Dietary Restrictions and Preferences

The South African NSNP guidelines stresses accommodating learners' dietary restrictions and preferences when planning and serving meals. They suggest that schools consider religious, cultural, and medical dietary needs and individual food preferences to ensure that all learners may access meals that meet their nutritional requirements (DoE, 2009). However, the 2023 DBE report indicates that dietary preferences are not the responsibility of the DBE but that of the health care addition; the guidelines do not explicitly address dietary restrictions and preferences during school holidays, leaving a gap in providing specific guidance.

To adhere to the dietary restrictions and preferences guidelines means recognising the diversity of learners' dietary needs and ensuring that meals are inclusive and accommodating for schools. These guidelines emphasise respecting learners' cultural and religious beliefs while promoting their health and well-being. During regular school hours, the guidelines mean that schools should consider learners' dietary restrictions and preferences when planning and serving meals. However, due to the lack of specific guidance for school holidays, schools might face challenges addressing dietary needs during holidays.

Hazell et al. (2016) and Nhlapo, Lues, Kativu and Groenewald (2015) randomly chose 10 schools in Bloemfontein and analysed their meals for nutritional composition concerning the diverse needs of children aged 11 to 18. They indicated that those meals did not match the nutrient criteria for carbohydrates and energy. Only 40% of the protein requirements, 10% of the calcium and zinc requirements, and 30% of the iron requirements were met. The amount of vitamins A and E in the blood was undetectable in both tests. There was a lot of difference in the nutrient content of meals with similar ingredients, which could be due to long storage periods or exposure to light and oxygen, which causes food to deteriorate (Hazell et al., 2016).

From the literature we discovered that South African children eat carbohydrate-rich diets with inadequate levels of other nutrients. Fresh fruit and vegetables and animal protein are scarce, and the diets are monotonous. Fruit and vegetables were the most frequently overlooked food group (Devereux et al., 2018). The following reasons were given: money for the South African NSNP was not received, deliveries were not made, and deliveries were short. There were also issues regarding the amount of food prepared for the number of learners approved for the South African NSNP. A large majority of schools cooked more than 100% or less than 80% of the quantities of each food category that they were supposed to prepare daily (Nhlapo et al., 2015).

Furthermore, Iddrisu (2018) and Tagoe (2018) highlight the challenges that schools face in meeting diverse dietary needs due to resource limitations, complexities of menu planning and other factors. They argue that such challenges hinder schools from fully aligning with the guidelines. Given the absence of specific guidance for school holidays, schools could advocate for extending guidelines to cover holiday periods or finding practical ways to accommodate diverse needs during holidays. Additionally, they might advocate for adapting meal offerings during school holidays.

For the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), the guidelines for dietary restrictions and preferences align with the principle of perceived benefits. They aim to promote learners' healthy eating by offering meals that are familiar to them and align with their cultural, religious, and medical needs. Furthermore, cues to action prompt schools to take action to provide inclusive meals. But, during school holidays, the lack of specific guidance might relate to the perceived barriers in the HBM. Therefore, schools might face challenges maintaining the same level

of accommodation for dietary restrictions and preferences during holidays, which could impact learners' well-being.

Recommendations

The South African NSNP guidelines should be expanded to include school holidays, ensuring that learners' nutritional and dietary needs are met consistently. Schools should adopt adaptable implementation strategies, collaborating with nutrition experts to tailor menu plans and portions to meet diverse dietary needs (Pérez-Escamilla, 2017). The DBE should invest in continuous training and support for staff responsible for implementing the guidelines, including workshops on effective menu planning, food safety, and accommodating dietary restrictions (Banda, 2021). In addition, schools should promote a strong food safety culture through training on hygiene and food storage practices (Devereux et al., 2018).

For the HBM framework (Boskey, 2024; Etheridge et al., 2023; McKellar & Sillence, 2020; Rosenstock et al., 1988), the dietary restrictions and preference guidelines align with the principle of perceived benefits. They aim to promote learners' healthy eating by offering meals that are familiar to them and align with their cultural, religious, and medical needs. Furthermore, cues to action prompt schools to take action to provide inclusive meals. But, during school holidays, the lack of specific guidelines might relate to the perceived barriers in the HBM. Therefore, schools might face challenges maintaining the same level of accommodation for dietary restrictions and preferences during holidays, which could impact learners' well-being.

Fostering collaboration with stakeholders, such as nutrition experts, scholars, parents, and learners is crucial for providing valuable insight into implementing the guidelines. Additionally, it is important to establish robust monitoring and evaluation frameworks essential for regular assessments of schools' adherence to the guidelines and their impact on learners' nutritional intake and well-being. This will assist with the identification of areas for improvement and successful strategies.

Conclusion

Studies have shown that school meal programmes, like China's nutrition improvement programme, greatly improve the cognitive skills of learners from poor families. The mechanisms underpinning this impact include improved health status and increased optimistic expectations about the future (Zhao et al., 2024). These findings suggest that other lower middle-income countries (LMICs) might also benefit from similar programmes adapted to their contexts, as improvements in child nutrition could increase educational productivity with longer-term spillovers into the societies concerned. Schools provide critical opportunities for the promotion of healthy eating behaviour among children and adolescents. A systematic review highlights the effectiveness of these programmes in improving nutritional status and instigating lifestyle changes, although long-term sustainability remains a concern (Chatterjee & Nirgude, 2024). LMICs should consider the unique cultural, economic, and infrastructural challenges that they face when designing and implementing nutrition programmes, ensuring that interventions are not only effective but also sustainable over time.

Apart from this, health promotion initiatives in schools have also shown positive effects on the performance and well-being of school children. Programmes on awareness of diets have a positive impact on educational outcomes (Moliterno et al., 2024). This, therefore, calls for LMICs to integrate health education into their curricula since they would initiate improved nutrition and academic outcomes. The critical prevalence of malnutrition among school-going children in countries such as India puts forward an urgent need for targeted dietary interventions (Ghosh & Kathayat, 2023). LMICs must address their needs regarding nutritional requirements so that dietary programmes implemented are contextually appropriate and adaptable within real-life situations. Adaptability is an intrinsic factor that is required for real improvement in the health and educational achievements of children. Moreover, collaborative approaches have brought about shifts in children's nutritional behaviour. Participatory action research conducted in Nepal demonstrates that nutrition education programmes co-designed with community involvement can effectively engage families and stakeholders in these initiatives, highlighting the significance of collaboration in such programmes (Upreti, Devkota, Bastien & Luitel, 2024). LMICs could use this community resource and knowledge to build ownership and responsibility for any nutritional programme.

The following potential research questions emerged from this study, outlining the needs and prevailing circumstances of LMICs: How could school nutrition programmes be adapted to local tastes and cultural habits in LMICs?; What is the role of stakeholders in the successful implementation of nutrition initiatives in schools, and how can they be effectively involved?; How can the long-term sustainability of school-based nutrition programmes be ensured in lower- and middle-income countries?; To what extent does integrated health education affect nutritional status and academic performance in different LMIC contexts?

By attending to these questions, researchers can make potentially valuable contributions to informing the development and implementation of

effective nutrition programmes that promote health and academic success among children in LMICs. The South African NSNP guidelines are crucial in guiding schools in providing nutritious meals to learners. They cover menu planning, nutritional adequacy, hygiene, dietary accommodations, and food safety. The guidelines align with the HBM principles, promoting healthy eating habits, dietary adjustments, and food safety measures. However, challenges arise during school holidays, necessitating the development and adaptation of further guidelines. Recommendations were thus formulated to extend the guidelines to cover school holidays, adaptable implementation strategies, ongoing training, creating a food safety culture, stakeholder involvement, and full-scale monitoring and evaluation. Using the South African guidelines for the NSNP will most likely bring about influences in learners' lives in respect of healthy eating behaviour, assurance of dietary sufficiency, and prioritisation of food safety. By adherence to these recommendations and iterative refinement, the DBE can create a more comprehensive framework that supports the health and development of learners across South Africa.

Authors' Contributions

This article was derived from a master's dissertation by Mulaudzi Lebohang. Professor M. Reyneke was the supervisor while Doctor N. Gcelu was the co-supervisor The manuscript was written by ML. MR assisted with the analysis while NG assisted with the methodology and literature review. All authors reviewed the final manuscript.

Notes

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References

Alderman H & Bundy D 2012. School feeding programs and development: Are we framing the question correctly? *The World Bank Research Observer,* 27(2):204–221. https://doi.org/10.1093/wbro/lkr005

Alexander G, Matoti S & Van Zyl P 2021. Ascertaining the use of extracurricular activities in promoting learners' holistic development in multicultural school settings. In M Carmo (ed). *Education and new developments*. Lisboa, Portugal: Science Press. https://doi.org/10.36315/2021end039

Aliyar R, Gelli A & Hamdani SH 2015. A review of nutritional guidelines and menu compositions for school feeding programs in 12 countries. *Frontiers in Public Health*, 3:148. https://doi.org/10.3389/fpubh.2015.00148

Banda M 2021. It takes a full stomach to feed the mind: The ins and outs of South Africa's school feeding scheme. *Daily Maverick*, 4 March. Available at https://www.dailymaverick.co.za/article/2021-03-04-it-takes-a-full-stomach-to-feed-the-mind-the-ins-and-outs-of-south-africas-school-feeding-scheme/. Accessed 3 July 2025.

Borkowski A, Ortiz Correa JS, Bundy DAP, Burbano C, Hayashi C, Lloyd-Evans E, Neitzel J & Reuge N 2021. *COVID-19: Missing more than a classroom. The impact of school closures on children's nutrition* (Innocenti Working Paper WP-2021-01). Florence, Italy: UNICEF Office of Research-Innocenti. https://doi.org/10.18356/25206796-2021-01

Boskey E 2024. *How the health belief model influences your behaviors*. Available at https://www.verywellmind.com/health-belief-model-3132721. Accessed 3 July 2025.

Chatterjee P & Nirgude A 2024. A systematic review of school-based nutrition interventions for promoting healthy dietary practices and lifestyle among school children and adolescents. *Cureus*, 16(1):e53127. https://doi.org/10.7759/cureus.53127

Department of Basic Education, Republic of South Africa 2023. *Annual performance plan 2023/24*. Pretoria: Author. Available at https://www.education.gov.za/Portals/0/Documents/Reports/DBE%20Annual%20Performance%20Plan%20202324_10%20March%202023.pdf?ver=2023-03-22-133909-310. Accessed 3 July 2025.

Department of Education 2009. *National school nutrition programme*. Pretoria, South Africa: Government Printer.

Devereux S, Hochfeld T, Karriem A, Mensah C, Morahanye M, Msimango T, Mukubonda A, Naicker S, Nkomo G, Sanders D & Sanousi M 2018. *School Feeding in South Africa: What we know, what we don't know, what we need to know, what we need to do* (Food Security SA Working Paper Series No. 004). Pretoria, South Africa: DST-NRF Centre of Excellence in Food Security. Available at https://www.researchgate.net/profile/Abdulrazak-Karriem/publication/325828674_June_2018_School_Feeding_in_South_Africa_What_we_know_what_we_don't_know_what_we_need_to_know_what_we_need_to_do_Food_Security_SA_Working_Paper_Series_No_004_DST-NRF_Centre_of_Excellence_in_Food_Secur/links/5b282a8aa6fdcca0f09c42cf/June-2018-School-Feeding-in-South-Africa-What-we-know-what-we-dont-know-what-we-need-to-know-what-we-need-to-do-Food-Security-SA-Working-Paper-Series-No-004-DST-NRF-Centre-of-Excellence-in-Food-Se.pdf. Accessed 28 March 2021.

El Ghoch M & Valerio A 2020. Let food be the medicine, but not for coronavirus: Nutrition and food science, telling myths from facts. *Journal of Population Therapeutics & Clinical Pharmacology*, 27(SP1):e1–e4. https://doi.org/10.15586/jptcp.v27iSP1.682

Esakov HJ & Vally S 2010. *School nutrition and the rights of learners*. Johannesburg, South Africa: Centre for Education Rights and Transformation, University of Johannesburg. Available at https://www.uj.ac.za/wp-content/uploads/2021/11/school-nutrition-and-the-rights-of-learners.pdf. Accessed 4 April 2022.

Etheridge JC, Sinyard RD & Brindle ME 2023. Implementation research. In AEM Eltorai, JA Bakal, PC Newell & AJ Osband (eds).

Translational surgery: Handbook for designing and conducting clinical and translational research. Cambridge, MA: Academic Press. https://doi.org/10.1016/C2020-0-03609-1

Faber M, De Villiers A, Hill J, Van Jaarsveld PJ, Okeyo AP & Seekoe E 2019. Nutrient profile and energy cost of food sold by informal food vendors to learners in primary and secondary schools in the Eastern Cape, South Africa. *Public Health Nutrition*, 22(3):521–530. https://doi.org/10.1017/S1368980018003464

Feldman C, Veiros MB & McGill T 2018. School lunches: Getting healthy food on the menu in government-sponsored lunch programmes in the United States and Brazil. *Perspectives in Public Health*, 138(2):89–90. https://doi.org/10.1177/1757913917743204

Food and Agricultural Organization of the United Nations, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme & World Health Organization 2020. *The state of food security and nutrition in the world 2020: Transforming food systems for affordable healthy diets*. Rome, Italy: FAO. https://doi.org/10.4060/ca9692en

Ghosh A & Kathayat L 2023. Nutritional demands in schools children for performance and health: A brief review in India. *Journal of Exercise Science & Physiotherapy*, 19(2):18–28. https://doi.org/10.18376/jesp/2023/v19/i2/223655

Govender P, Subban M & Wessels JS 2021. Implementation of a national school nutrition programme: The case of selected South African schools. In JS Wessels, T Potgieter & T Naidoo (eds). *Public administration challenges: Cases from Africa*. Pretoria, South Africa: Juta. Available at https://hdl.handle.net/10500/28160. Accessed 15 April 2021.

Graham L, Hochfeld T, Stuart L & Van Gent M 2015. *Evaluation study of the National School Nutrition Programme and the Tiger Brands Foundation in-school breakfast feeding programme in the Lady Frere and Qumbu districts of the Eastern Cape*. Johannesburg, South Africa: Centre for Social Development in Africa (CSDA), University of Johannesburg. Available at https://www.uj.ac.za/wp-content/uploads/2021/10/tbf-nutrition-report-2015-final-web-version.pdf. Accessed 4 July 2025.

Gresse A, Nomvete A & Walter C 2017. Situational analysis: Implementation of the National School Nutrition Programme in low socio-economic primary schools in Nelson Mandela Bay [Special edition]. *Journal of Consumer Sciences*, 2:59–68. Available at https://www.ajol.info/index.php/jfecs/article/view/160609. Accessed 10 June 2021.

Hazell E, Mawoyo M, Jack M, Shindler J, Rddi B, Marera DH, Mugo H, Petersen Z, Morake L, Wenhold F, Schonfeldt H, Balchin N & Roscani L 2016. *Report on the implementation evaluation of the National School Nutrition Programme*. Pretoria, South Africa: Department of Planning, Monitoring and Evaluation. Available at https://www.education.gov.za/Portals/0/Documents/Publications/NSNP%20Documents/2.%20NSNP%20Summary%20Report.pdf?ver=2018-11-09-083251-100. Accessed 2 July 2025.

Iddrisu I 2018. Improving school feeding through participation: Should the teacher be actively involved? *International Journal of Educational Management*, 32(1):141–154. https://doi.org/10.1108/IJEM-01-2017-0013

Irmak E 2021. The utilisation of deep learning based image processing method in the diagnosis of Alzheimer's disease. In B Nergis, S Bardak, M Kayar & AF Mendi (eds). *Research & reviews in engineering - I*. Ankara, Turkey: Yaşar Hız. Available at https://www.researchgate.net/profile/Can-Goenenli/publication/354858178_COMPARISON_OF_DIFFERENT_FINITE_ELEMENT_TYPES_IN_CURVED_PLATE_STRUCTURES/links/61516897f8c9c51a8af66766/COMPARISON-OF-DIFFERENT-FINITE-ELEMENT-TYPES-IN-CURVED-PLATE-STRUCTURES.pdf#page=55. Accessed 2 July 2025.

Knipe P 2022. The significance of Equal Education and Others v Department of Basic Education and Others. *ESR Review: Economic and Social Rights in South Africa*, 23(2):27–30. Available at https://journals.co.za/doi/epdf/10.10520/ejc-esrrev-v23-n2-a6. Accessed 2 July 2025.

Lochmiller CR 2021. Conducting thematic analysis with qualitative data. *The Qualitative Report*, 26(6):2029–2044. https://doi.org/10.46743/2160-3715/2021.5008

Mafugu T 2021. Challenges encountered in a South African School Nutrition Programme. *Journal of Public Health Research*, 10(1):1982. https://doi.org/10.4081/jphr.2021.1982

Mawela A & Van den Berg G 2020. Management of school nutrition programmes to improve environmental justice in schools: A South African case study. *South African Journal of Clinical Nutrition*, 33(2):30–35. https://doi.org/10.1080/16070658.2018.1507208

McKellar K & Sillence E 2020. *Teenagers, sexual health information and the digital age*. London, England: Academic Press.

Mensah C & Karriem A 2021. Harnessing public food procurement for sustainable rural livelihoods in South Africa through the National School Nutrition Programme: A qualitative assessment of contributions and challenges [Special issue]. *Sustainability*, 13(24):13838. https://doi.org/10.3390/su132413838

Moliterno A, Da Silva TA, De Meira MZC, Furlan PLL, Dos Santos Brito B, Campos MJG, Inácio CS & De Lima Santos A 2024. Promoting health in public schools: An experience report on the importance of healthy eating. *Seven Editora*:592–595. https://doi.org/10.56238/sevened2024.001-047

Mulaudzi L, Reyneke M & Gcelu N 2024. Evaluating the South African National School Nutrition Programme during school breaks against the core principles and the right to education the Convention on the rights of the child. *Cogent Social Sciences*, 10(1):2290692. https://doi.org/10.1080/23311886.2023.2290692

Munje PN & Jita LC 2019. The implementation of the school feeding scheme (SFS) in South African Public primary schools. *Educational Practice and*

Theory, 41(2):25–42. https://doi.org/10.7459/ept/41.2.03

Muvhango TG 2016. Learners' perceptions of feeding scheme programmes at secondary schools in the Nzhelele east circuit, Limpopo province. MEd dissertation. Pretoria, South Africa: University of South Africa. Available at https://uir.unisa.ac.za/server/api/core/bitstreams/55b3798c-a952-4615-91d3-c8879f8fd8bd/content. Accessed 1 July 2025.

Myers MD 2019. *Qualitative research in business and management*. London, England: Sage.

Nhlapo N, Lues RJF, Kativu E & Groenewald WH 2015. Assessing the quality of food served under a South African school feeding scheme: A nutritional analysis. *South African Journal of Science*, 111(1/2):Art. #2014-0044, 9 pages. https://doi.org/10.17159/sajs.2015/20140044

Nilson P 2016. *Improving education in South Africa*. Available at https://borgenproject.org/education-in-south-africa/. Accessed 20 June 2023.

Nomakhushe D 2018. An investigation on food safety of the National School Nutrition Programme in Peddie, Eastern Cape, South Africa. M.P.H. thesis. Bellville, South Africa: University of the Western Cape.

Perera S 2018. *Research paradigms*. Singapore: Sage.

Pérez-Escamilla R 2017. Food security and the 2015–2030 Sustainable Development Goals: From human to planetary health. *Current Developments in Nutrition*, 1(7):e000513. https://doi.org/10.3945/cdn.117.000513

Pitseng AN 2016. An assessment of the implementation and management of the National School Nutrition Programme in Bakenberg North Circuit secondary schools, Limpopo Province. MBA dissertation. Polokwane, South Africa: University of Limpopo. Available at http://ulspace.ul.ac.za/bitstream/handle/10386/3921/pitseng_an_2016.pdf?sequence=1&isAllowed=y. Accessed 30 June 2025.

Public Service Commission 2008. *Report on the evaluation of the National School Nutrition Programme (NSNP)*. Pretoria, South Africa: Author. Available at https://www.psc.gov.za/documents/2008/Refined Nutrition Text.pdf. Accessed 29 April 2021.

Rendall-Mkosi K, Wenhold F & Sibanda N 2013. *Case study of the National School Nutrition Programme in South Africa*. Pretoria, South Africa: University of Pretoria.

Reyneke M 2020. The constitutionality of suspending the South African National School Nutrition Programme during the Covid pandemic: The *Equal Education case*. *International Journal for Education Law and Policy*, 16:223–232.

Romani L, Barmeyer C, Primecz H & Pilhofer K 2018. Cross-cultural management studies: State of the field in the four research paradigms. *International Studies of Management & Organization*, 48(3):247–263. https://doi.org/10.1080/00208825.2018.1480918

Rosenstock IM, Strecher VJ & Becker MH 1988. Social learning theory and the health belief model. *Health Education Quarterly*, 15(2):175–183. https://doi.org/10.1177/109019818801500203

Samodien E, Abrahams Y, Muller C, Louw J & Chellan N 2021. Non-communicable diseases - a catastrophe for South Africa. *South African Journal of Science*, 117(5/6):Art. #8638. https://doi.org/10.17159/sajs.2021/8638

Sanousi M 2019. The expected effects of the National School Nutrition Programme: Evidence from a case study in Cape Town, Western Cape. MDS thesis. Cape Town, South Africa: University of the Western Cape. Available at https://uwcscholar.uwc.ac.za:8443/server/api/core/bitstreams/f62c7f18-52f5-4e8d-814f-4ccbe981314b/content. Accessed 30 June 2025.

Sibanyoni JJ, Tshabalala PA & Tabit FT 2017. Food safety knowledge and awareness of food handlers in school feeding programmes in Mpumalanga, South Africa. *Food Control*, 73(Pt. B):1397–1406. https://doi.org/10.1016/j.foodcont.2016.11.001

Snyder H 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104:333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Tagoe I 2018. The Ghana national School Feeding Program: Peoples' perceptions about the program's impact on school enrolment, attendance and completion. MPA thesis. Bowling Green, OH: Bowling Green State University. Available at https://etd.ohiolink.edu/acprod/odb_etd/ws/send_file/send?accession=bgsu1521682869298246&disposition=inline. Accessed 30 June 2025.

Tshisikhawe MP 2017. Challenges in implementing the National School Nutrition Programme for achieving educational objectives: A case study of schools in Vhembe District, Limpopo, South Africa. PhD dissertation. Thohoyandou, South Africa: University of Venda. Available at https://univendspace.univen.ac.za/server/api/core/bitstreams/618b7fe4-34fb-429d-8942-f0e1b26b195a/content. Accessed 30 June 2025.

Upreti YR, Devkota B, Bastien S & Luitel BC 2024. Developing a school-based nutrition education programme to transform the nutritional behaviours of basic-level schoolchildren: A case from participatory action research in Nepal. *Educational Action Research*, 32(3):528–547. https://doi.org/10.1080/09650792.2023.2206580

Wang D & Fawzi WW 2020. Impacts of school feeding on educational and health outcomes of school-age children and adolescents in low- and middle-income countries: Protocol for a systematic review and meta-analysis. *Systematic Reviews*, 9(1):55. https://doi.org/10.1186/s13643-020-01317-6

Washinyira T 2020. "Some learners don't get proper meals at home and come to school hungry": How a special needs school in Gugulethu feeds over 300 learners daily. *GroundUp*, 28 October. Available at https://www.groundup.org.za/article/some-learners-dont-get-proper-meals-at-home-and-come-to-school-hungry/. Accessed 21 July 2023.

Zenebe M, Gebremedhin S, Henry CJ & Regassa N 2018. School feeding program has resulted in improved dietary diversity, nutritional status and class attendance of school children. *Italian Journal of Pediatrics*, 44(1):16. https://doi.org/10.1186/s13052-018-0449-1

Zhao C, Chen B & Song Z 2024. School nutritious

feeding and cognitive abilities of students in poverty: Evidence from the nutrition improvement program in China. *Children and Youth Services Review*, 159:107519. https://doi.org/10.1016/j.childyouth.2024.107519