

The Impact and Challenges of South African School Feeding Programmes in the COVID-19 Context

Eridiong Onyenweaku^{1*}, PhD;  Hema Kesa¹, PhD

¹Food Evolution Research Laboratory, School of Tourism and Hospitality, College of Business and Economics, University of Johannesburg, South Africa

*Corresponding author: Eridiong Onyenweaku, PhD; Food Evolution Research Laboratory, School of Tourism and Hospitality, College of Business and Economics, University of Johannesburg, Postal code: 2092, South Africa. Tel: +23 480 37217115; Email: eridiongo@uj.ac.za

Received: May 15, 2023; Revised: July 27, 2023; Accepted: August 14, 2023

Abstract

Background: Many individuals are grappling with food insecurity due to the ongoing global recession. Childhood malnutrition poses a risk factor for adult morbidities, underscoring the need for cost-effective strategies to prevent and combat this issue. This study aimed to determine the impact and challenges of in-school nutrition programs, shedding light on the difficulties faced within the context of the COVID-19 pandemic.

Methods: A cross-sectional survey of schools across four South African provinces—Gauteng, Western Cape, Northwest, and KwaZulu-Natal—was conducted between April 2022 and May 2022. A total of 36 schools were selected at random. Three interviews (questionnaires) were administered to each school's principal, teacher, and food handler. Additionally, an observational checklist was employed. Qualitative data underwent thematic analysis utilizing an inductive approach through Atlas.ti software, while Microsoft Excel was utilized to analyze the checklist data. Results were presented using descriptive statistics.

Results: The school communities have experienced substantial overall benefits from the school feeding programs. Survey results demonstrated a noteworthy reduction in the prevalence of unemployment, poverty, dependency on grants, and larger families within the surveyed districts. However, some meals were consumed less frequently due to a lack of flavor.

Conclusions: The school feeding programs have yielded positive impacts. In order to enhance outcomes, there is a need to incorporate more protein-rich foods (such as meat and eggs) and a more comprehensive array of spices/flavors. These changes will respectively enhance the nutritional content and appeal of the meals.

Keywords: Malnutrition, Child, COVID-19, In-school nutrition, Feeding programmes

How to Cite: Onyenweaku E, Kesa H. The Impact and Challenges of South African School Feeding Programmes in the COVID-19 Context. Int. J. School. Health. 2023;10(4):225-237. doi: 10.30476/INTJSH.2023.98886.1311.

1. Introduction

Over the past three decades, numerous countries have significantly improved child nutrition. However, South Africa continues to grapple with high rates of malnutrition and stunting. Approximately one in four children in the country is affected by stunting, and acute malnutrition contributes to one-third of all in-hospital deaths (1). These concerning trends indicate inadequate nutritional intake, often stemming from elevated levels of food insecurity. In response, the South African government introduced the National School Nutrition Programme (NSNP), an initiative that has been pivotal in addressing this issue. The NSNP provides meals to over nine million children daily during the school year. The program's primary objective is to fulfil 30-40% of a child's recommended daily dietary allowance (RDA). Over several years, the NSNP has formed collaborations with various public and private organizations, including the Tiger Brands Foundation (TBF), to

augment its in-school nutritional contributions. As a result of these collaborations, numerous schools now offer breakfast in addition to the NSNP-provided lunch. These efforts represent crucial interventions in food security and poverty alleviation (2, 3).

1.1. COVID-19 and Food Insecurity

The nutrition status of infants and young children has faced further deterioration due to several compounding factors, such as the food crisis 2008, escalating political instability, looming conflicts, and the current coronavirus pandemic (4, 5). Notably, the COVID-19 pandemic has significantly exacerbated the issue of food insecurity and disrupted the consistent provision of meals to school-going children. As nutrition emerges as a pivotal risk factor for chronic diseases, scientific evidence increasingly underscores the profound impact of dietary adjustments on health across the lifespan (6, 7).

To date, children appear to have largely been spared from the direct health effects of the pandemic, but the crisis is still significantly impacting their well-being (8). According to the United Nations Statistics Division (9), children of all ages in different countries are affected, particularly by the socio-economic impacts and, in some cases, by mitigation measures that may inadvertently cause more harm than good (10). As a global crisis, the impact on many children may be lifelong (11, 12). Furthermore, the detrimental effects of this pandemic are not equally distributed; children in the poorest countries and the most impoverished neighborhoods are the most brutal hit, especially those already in disadvantaged or vulnerable situations. There are three primary channels through which children are affected by this crisis: infection by the virus itself, the immediate socio-economic impacts of measures to halt the virus's spread, and the potential long-term effects of delayed implementation of the Sustainable Development Goals.

1.2. School Feeding Programs in South Africa

In many quintile 1-3 schools in South Africa, breakfast is provided in addition to the NSNP lunch, either through the NSNP program itself or via public or private partners, such as the TBF. However, the COVID-19 pandemic significantly disrupted schools' ability to feed children (13) consistently. Public health measures led to school closures and rotational schooling. Heightened health safety measures may also have caused delays in food preparation and serving, and there were some anecdotal reports of difficulties in sourcing ingredients, particularly proteins.

Food security has been defined as the "availability and accessibility of food of sufficient quality and quantity in a socially and culturally acceptable manner" (14). Furthermore, nutritional security acknowledges that gender, education, access to water, and sanitation all impact nutritional status beyond food availability. Food sovereignty suggested securing the right to food, including people's access to food production, such as land, fishing resources, and seeds (15). In 2012, the Human Sciences Research Council (HSRC) conducted the first South African Health and Nutrition Examination Survey (SANHANES-1). Using other survey data, SANHANES-1 found that hunger decreased from 52.3% in 1999 to 25.9%

in 2008 and 26.0% in 2012. Some provinces like Limpopo (30.8%) and the Eastern Cape (36.2%) recorded higher rates of hunger in 2012 (16).

School feeding programs have a dual objective of supporting education through two primary pathways: 1) enhancing school access and participation, as these programs serve as incentives for children to attend school, and 2) improving learning capabilities by ensuring better nutritional intake (17). Schools serve as excellent platforms for implementing health and education interventions, given the widespread attendance of children.

1.3. Advantages of In-School Nutrition

There exist several compelling reasons to implement school meal initiatives, which encompass the following aspects:

- **Nutrition:** Providing adequate nourishment plays a pivotal role in enhancing the nutritional well-being of children. School meals can address malnutrition-related issues, including micronutrient deficiencies, provided that the meals incorporate the specific micronutrients lacking in children's diets (16). The significance of this observation is heightened by the findings of SANHANES-1, which highlighted a substantial prevalence of vitamin A deficiency (16).

- **Short-term Hunger:** Implementation of school feeding programs effectively diminishes short-term hunger among students. Consequently, this reduction in hunger positively influences concentration levels within the classroom, ultimately leading to enhanced learning outcomes.

- **Attendance:** School meal programs motivate families to send their children to school, fostering higher attendance and enrollment rates, particularly among girls (18, 19). Prolonged periods spent in school and attaining advanced educational milestones are believed to mitigate risks associated with teenage pregnancy and HIV infection (14).

- **Support for Orphaned and Vulnerable Children:** Children affected by HIV and AIDS and those residing in impoverished conditions or within child-headed households often rely on school meals as a vital source of daily sustenance.

- **Stimulation of Agriculture:** By sourcing food

from local farmers, selecting in-school nutrition programs stimulate agricultural activities. This approach provides local farmers with a consistent market and stable prices and encourages the adoption of improved production techniques (19).

In essence, school feeding programs are indispensable in bolstering educational pursuits and addressing various socio-economic challenges children face. The multi-faceted benefits encompass nutritional enhancement, improved classroom engagement, heightened attendance rates, support for vulnerable population segments, and promotion of sustainable agricultural practices.

1.4. Challenges in Child Nutrition

The implementation of strict lockdown measures caused a significant surge in unemployment and food insecurity, amplifying the risks to children's nutrition and overall health. A study (20) revealed that the initial stringent COVID-19 lockdown resulted in job loss, poverty, and isolation from protective social networks, depriving many families of the necessary resources for child care. In April 2020, during the level 5 lockdown, nearly half (47%) of households reported running out of funds for purchasing food. Notably, 15% of households experienced child hunger (21, 22). Additionally, there was a considerable surge in food prices, with a 12.6% increase in the cost of a basic household food basket observed between March 2020 and March 2021 (23). These challenges at the household level were exacerbated by the closure of schools and the suspension of the National School Nutrition Programme (NSNP), which typically provides nutritious meals daily to over nine million children during the school term. The closure of Early Childhood Development (ECD) facilities further exacerbated the situation, causing young children who relied on these facilities for nutrition to lose access. To address the impact of the lockdown, the national government initiated a disaster relief program in May 2020. This program included top-ups to social grants, the introduction of the COVID-19 Social Relief of Distress (SRD) grant and COVID-19 Caregiver Allowance, the implementation of the Temporary Employer/Employee Relief Scheme (TERS), and emergency food assistance (24). These measures positively influenced the rates of household and child hunger during that period. However, households receiving the Child Support Grant were particularly affected

by discontinuing the grant top-ups and Caregiver Allowance. As a result, levels of food insecurity remained persistently high, with one in seven households reporting child hunger in February 2021 and April 2021 (24). The impact of food insecurity and hunger was most pronounced among impoverished populations, those residing in rural areas, and larger households (25, 26).

The COVID-19 pandemic also disrupted young children's access to routine healthcare services. In South Africa, an established social assistance program supports underprivileged children, the elderly, and individuals with disabilities. Before the onset of COVID-19, more than 18 million individuals received social grants monthly. Social assistance was pivotal in the disaster relief response (13).

This study aimed to evaluate the implications of in-school nutrition programs, particularly in the context of the COVID-19 pandemic. Furthermore, the study sought to identify the challenges encountered in implementing these feeding programs at selected schools in four South African provinces during this period.

2. Methods

2.1. Participants

This study comprised a cross-sectional survey conducted over two months (from April 2022 to May 2022) in four South African provinces: Gauteng, Western Cape, North West (NW), and KwaZulu-Natal (KZN). These provinces include breakfast and lunch as part of the NSNP in-school nutrition program. Researchers randomly selected one district in each province and then chose three schools from the district lists, ensuring representation from each eligible quintile. Further details about the selected provinces and districts are available in Table 1.

2.2. Instrumentation

This study employed a qualitative approach to gain an in-depth understanding of the perspectives of key stakeholders regarding how shifts in the in-school nutrition programs during the COVID-19 pandemic have impacted communities, along with highlighting the challenges faced. The study utilized three interview instruments: one for principals or NSNP coordinators, another for food handlers,

Table 1: Sample of principals/coordinators, food handlers and teachers in the study

Province	Gauteng	Western Cape	North West	Kwazulu-Natal	Total
Districts	Johannesburg East	Cape Winelands	Bojanala	Uthukela	
Principals/Coordinators	3	3	3	3	12
Food handlers	3	3	3	3	12
Teachers	3	3	3	3	12
Total	9	9	9	9	36

and a third for teachers. Additionally, a checklist was used to assess the nutritional and health status of the children, as well as the hygiene conditions in the kitchen. The checklist design drew from past Department of Basic Education (DBE) reports, literature reviews, and our study objectives. The checklist encompassed sections such as Nutrition Evaluation, Menu Plan Assessment, Kitchen Hygiene, and Schoolchildren's Health Status. Although the checklist remained consistent across all 36 schools, the open-ended questionnaires administered to principals, NSNP coordinators, teachers, and food handlers were tailored to their specific responsibilities. The survey instruments underwent a pilot phase involving two schools in Gauteng Province, with six participants. However, these schools were subsequently excluded from the main study.

Inclusion criteria were:

Public primary schools (NSNP Quintile 1 – 3)

Principals, NSNP Coordinators, food handlers, and teachers

Limited to four South African provinces (Western Cape, Gauteng, North West, and KwaZulu Natal)

Inclusion of NSNP lunch meals and TBF Breakfast meals only

Moreover, exclusion criteria included:

High schools, Private schools, parents, and schoolchildren

2.3. Procedure

The process involved utilizing a random sampling technique to select districts and three schools per district. This selection was based on a provided list by the TBF (insert complete form of TBF). Subsequently, the study's details

were conveyed to the school representatives via telephone. Upon receiving their agreement, specific dates were scheduled for visiting the distinct schools.

Within each school, a deliberate effort was made to engage at least one principal/Coordinator, teacher, and food handler. Interviews were conducted with 36 individuals who voluntarily expressed interest in participating in the study. A comprehensive breakdown of participant numbers per province can be found in Table 1. The duration of each interview ranged from 15 to 20 minutes. A research assistant recorded the spoken content during the interviews while another team member completed the questionnaires.

The interview sessions were conducted within the designated Principals' offices, except for the Food handlers, who were interviewed in the kitchen areas. After the study, physical copies of the interview questionnaires were collected. Simultaneously, the recorded interviews were entrusted to a professional transcriber who transcribed the spoken content meticulously. In interviews conducted in KwaZulu-Natal, the initial interpretation from the Zulu language to English was necessary before transcription. Subsequently, the transcribed digital copies were meticulously cross-referenced against the hard copy questionnaires, systematically labeled, and then subjected to analysis using the Atlas.Ti software.

2.4. Informed Consent and Data Privacy

Before commencing the interviews and audio recordings, all respondents were provided with a content summary and encouraged to comprehend its contents thoroughly. Subsequently, each participant affixed their signature to an informed consent form appended to the survey instruments. These survey participants were assured that any collected data would exclusively be employed for research and recommendation objectives. While

respondents could provide their names on the interview forms, this information was exclusively employed for tracing and follow-up.

During the analysis phase and the presentation of findings, all collected data was systematically anonymized to ensure confidentiality and privacy.

2.5. Human Subjects Approval Statement

Ethical approval for the study was applied for and obtained from the University of Johannesburg's Faculty of Humanities Research Ethics Committee. Permission to access the schools and conduct the study was sought from and granted by the Provincial Departments of Education in all four provinces, with strict adherence to all ethical principles.

NSNP Coordinators, food handlers, teachers, and principals were comprehensively informed about the study's nature and purpose and the extent of their involvement.

2.6. Data Analysis

The interviews with Principals/Coordinators, teachers, and food handlers were meticulously transcribed and subsequently analyzed using ATLAS.ti software version 22.0. The checklists were analyzed using Microsoft Excel 365, with descriptive statistics such as charts and graphs to present the results.

3. Results

3.1. Socio-economic Status of School Communities

The participants were affiliated with the selected schools within the various surveyed districts. For each school, an interview was conducted with a principal or the NSNP Coordinator, followed by a teacher and a food handler. As indicated by the interview responses, Figure 1 illustrates the key characteristics of the school communities. A shared

characteristic across all provinces was the high unemployment rates and insufficient household access to food.

3.2. High Unemployment Rates Impacting Education and Community Welfare

Unemployment, a pervasive issue plaguing various communities, significantly affects the lives of learners and families across South Africa. Principals, coordinators, and educators from different provinces offer insight into the challenges stemming from this predicament, highlighting its far-reaching consequences.

1. Elevated Unemployment Rates: In Gauteng, a principal emphasizes that most learners, who hail from nearby hostels and informal settlements, come from households where approximately 90% of parents grapple with unemployment. This sentiment is echoed by another respondent in the same province, asserting their focus is on "the poorest of the poor" whose parents are predominantly unemployed. Such trends resonate across provinces; as one Coordinator mentions, the community faces impoverishment, with most parents reliant on sporadic farm work, which is far from a stable source of employment (North West). A teacher sheds light on the reality of seasonal work, stating that only during specific periods, like the peach or tangerine season, is employment available for all; otherwise, they remain without work (Western Cape).

2. Dependence on Grants: Unemployment's grasp has led numerous community members to rely heavily on government grants. As one coordinator remarks, most depend on grants, and even those employed are typically engaged in agricultural labor. This dependence is further exacerbated by external factors such as health crises (coronavirus and HIV), compelling children to be raised by their grandparents and consequently relying on grants for sustenance (KZN).

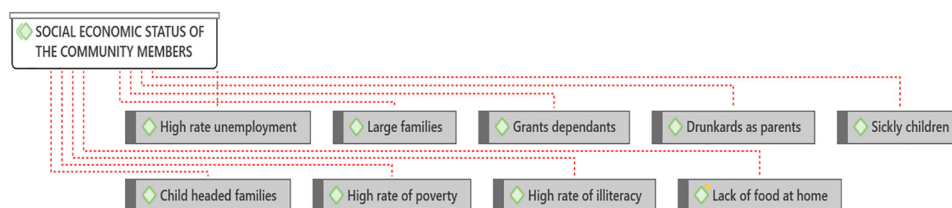


Figure 1: The figure show the socio-economic status of the communities.

3. Strain of Large Families: A prevailing observation is the prevalence of large families within the community. A principal in the Western Cape sheds light on the situation, noting that cramped living conditions accommodate several family members, leading to houses housing four to five people. In even more dire cases, a principal recounts encountering households with as many as seven or eight children alongside their mother.

4. Scarce Access to Food: Across provinces, respondents revealed that many learners come from households grappling with food scarcity. A coordinator from the North West province mentions learners who lack meals at home and consequently rely on school for breakfast and lunch. Meanwhile, a food handler in the Western Cape reinforces the notion that many students' homes are not conducive to regular meals.

5. Parental Alcohol Abuse: An unfortunate issue compounded the challenges learners face was parental alcohol abuse. A principal in Gauteng raises concerns about parents who drink excessively and sometimes even fail to return home. A coordinator from the Western Cape laments the adverse impact of parental alcohol abuse on learners, terming the circumstances "terrible."

6. Prior Health Challenges: The families' vulnerable circumstances have previously led to learners' ill health and absenteeism before the initiation of feeding programs. In KZN, a coordinator noted that malnutrition had rendered children sick, with evident signs such as rashes.

In addition to these prominent characteristics,

other distressing aspects define these communities, such as child-headed families (orphans living together without parental support), a pervasive poverty rate, and alarmingly high illiteracy levels.

3.3. Breakfast Assessment

3.3.1. Preferences for Breakfast: As inferred from the responses, graphically presented in Figure 2, the breakfast meal most favored by the learners is Jungle Oats. Nearly all respondents indicated that Jungle Oats is the preferred breakfast choice among the learners. A food handler from Gauteng stated, "But what they prefer the most is Jungle Oats. They all consume it." Additionally, a Coordinator from the North West province noted that the breakfast "has equally benefited all the students because these learners have a liking for breakfast, especially Jungle Oats." Another favored meal mentioned is Morvite; respondents from three out of four provinces indicated that their learners also enjoy it. However, respondents from Gauteng did not report their learners favoring Morvite. Furthermore, respondents from KZN indicated that the learners also have an affinity for Mabele. Gauteng also mentioned that some learners like Mabele.

3.3.2. Breakfast 'Dislikes': As conveyed by the respondents, the least preferred option among learners is Instant Porridge. According to a food handler from Gauteng, "... the learners are not very fond of instant porridge, but they do consume it." Another food handler from the North West expressed that the type of flavor used to prepare the instant porridge also influences the learners' preference. Mabele was mentioned by respondents,

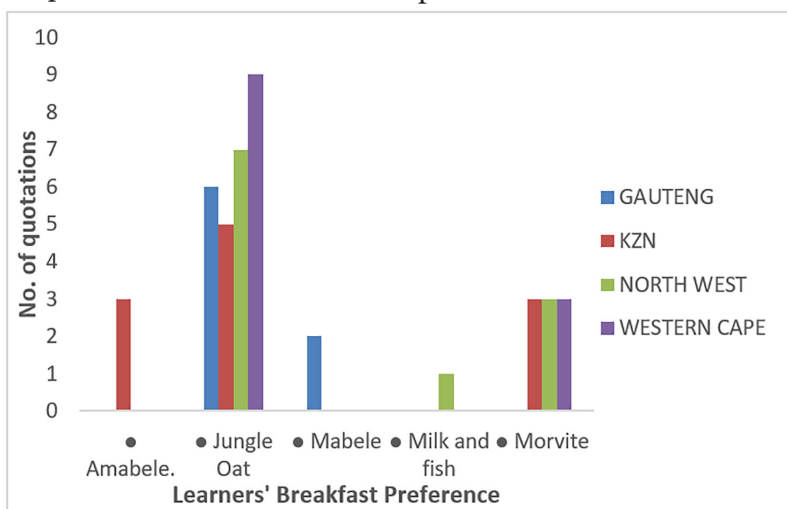


Figure 2: The figure shows the learners' breakfast preferences.

except in schools from KZN, while Morvite was indicated by respondents, except in schools from Gauteng. These responses are visually presented in Figure 3.

3.4. Lunch Assessment

3.4.1. Lunch Preferences: As depicted in Figure 4, based on responses from participants in this study, the lunch most preferred by the learners is fish and rice. A food handler from the North West stated, “For lunch, they enjoy eating rice and tinned fish, as well as samp and beans.” A food handler in KZN stated, “They have a liking for fish and rice, as well as soup, fish, cabbage, and samp with beans.” Other mentioned meals include amasi and fish with beans from KZN; pap and fish, samp, pap, and milk from Gauteng and the North West; and samp and beans

from the Western Cape.

3.5. Lunch Dislikes

Figure 5 illustrates the proportions of disliked lunch items among the learners. As depicted in the figure, many learners have an aversion to soya. Other meals reported as less preferred by the learners include amasi, samp, maize rice, rice, and soup.

3.6. General Observations and Challenges of In-School Nutrition Programs

Commenting on the in-school feeding program comprehensively, the respondents articulated their varied perspectives, which are enumerated below. Other challenges are elucidated in Figure 6.

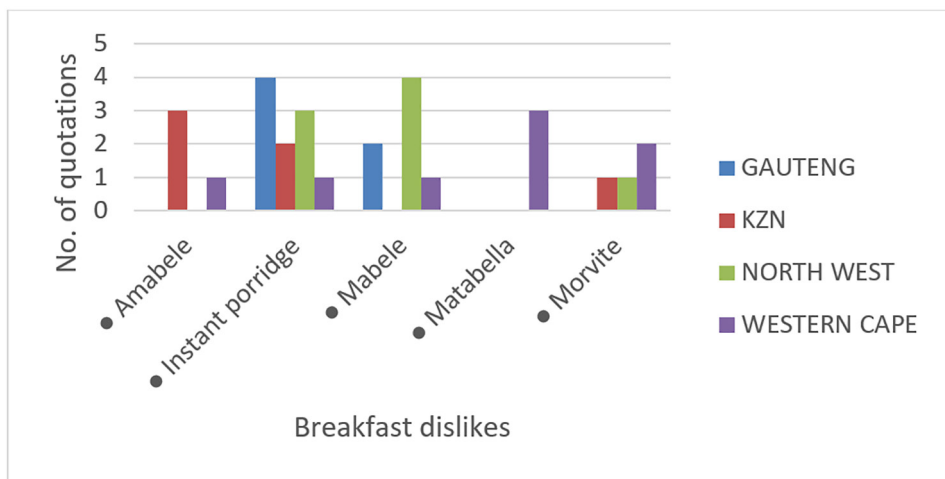


Figure 3: The figure shows the learners’ breakfast dislikes.

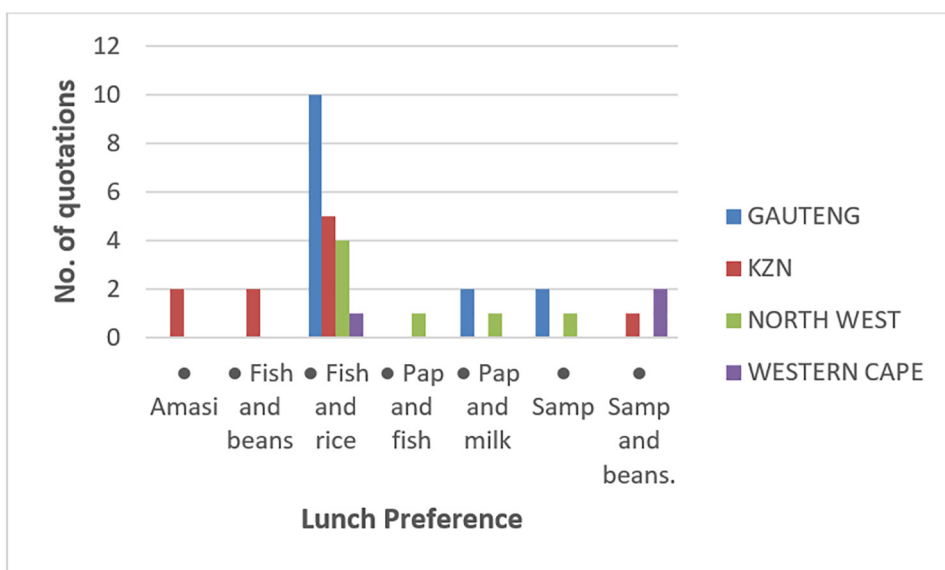


Figure 4: The figure shows the learners’ lunch preferences.

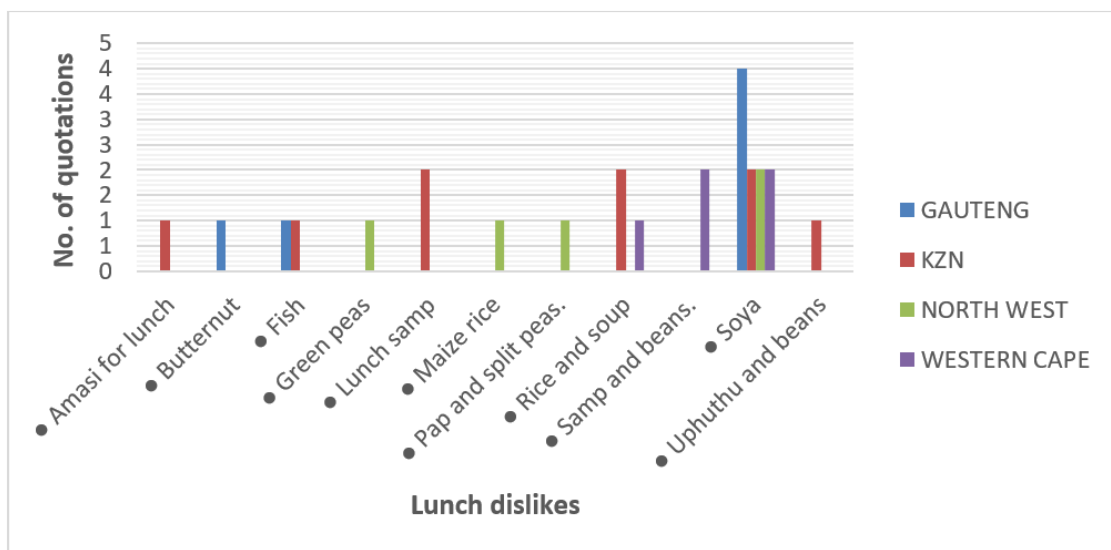


Figure 5: The figure shows the learners' lunch dislikes.

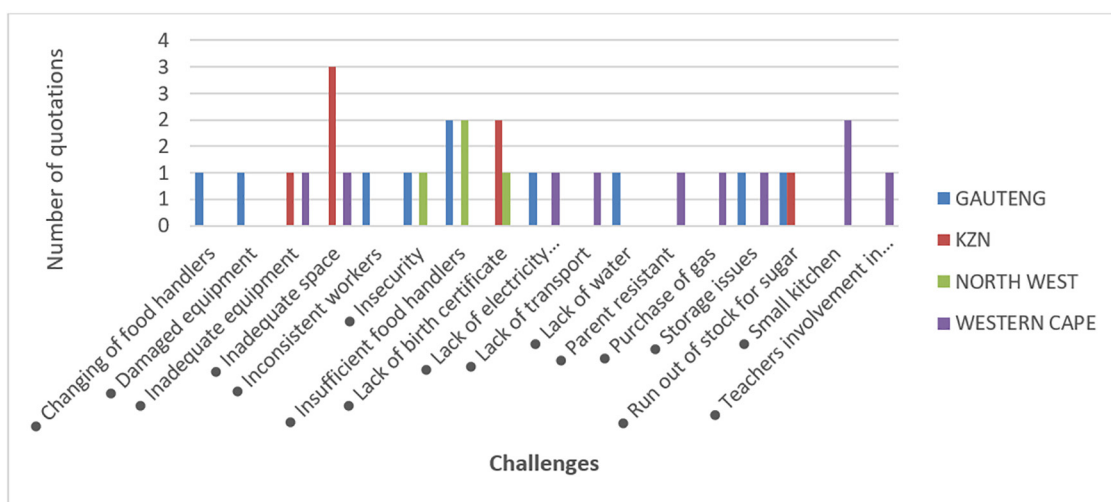


Figure 6: The figure shows the challenges of the school feeding programmes.

● **Stakeholder Approval:** The respondents emphasized that the school feeding program has been met with approval from all stakeholders. This appreciation consensus spans the school management, teachers, parents, feeding coordinators, food handlers, and learners. In the words of a Principal from the northwest region, “While I may not possess elaborate sentiments, I am immensely content. It is worth mentioning that all parties involved with the school are exceedingly content with the provision of breakfast by Tiger Brands and the NSNP lunch by the Department of Basic Education (DBE).”

● **Equitable Benefit for All Learners:** The insights from the interview sessions affirmed that all learners benefit from the feeding programs. A coordinator from School 2 in the North West

noted, “The benefits are equitably distributed among all students, as these learners particularly relish the breakfast, especially the jungle oats.” A Principal from Gauteng added, “The benefits are indiscriminately extended, even to our staff members when there is a surplus. Some staff members partake in the breakfast.”

● **Addressing Majority Learner Need:** The respondents also attested that most learners necessitate food provision. At the same time, a Coordinator from the Western Cape accentuated that the younger children have a greater need for nourishment.

● **Absence of Discrimination:** As underscored by a Principal from the Western Cape, the feeding initiative positively impacted children who may

have been reticent to eat due to disparities in fortune. *“The program instills confidence in the children who might have felt reticent because of their less fortunate circumstances. This newfound confidence enhances self-assuredness, resulting in improved student performance.”* A Principal from Gauteng added, *“Uniformity prevails, ensuring that no one feels superior or inferior, as all are treated with parity in terms of food quantity and quality.”*

- **Promotion of Hygiene:** The respondents also highlighted that the program cultivate a sense of hygiene among the learners. The practice of washing hands before and after meals was established. Food handlers have consistently maintained the cleanliness of kitchen facilities and utensils, a fact corroborated by field researchers in this study. A Principal from Gauteng elaborated, *“We uphold hygiene by allotting each classroom its own set of utensils, Sunlight dishwashing liquid, and dishcloth. Post-meal, learners wash their spoons and return them to the class.”*

- **Structured Program Execution:** The food handlers elucidated their operational procedures, a viewpoint shared by other respondents. The description encompasses their early arrival at the school, the preparation of breakfast, the distribution of meals, plate cleaning, lunch preparation, serving, and culminating with comprehensive cleaning before departure. Field researchers in this study also noted the commendable orderliness of these operations.

- **Serving a Substantial Population:** Most schools conveyed that they cater to an enrollment exceeding one thousand learners. A minority indicated student populations ranging from six hundred to nine hundred learners being served daily. Solely one school in the Western Cape noted a population range of 222 to 225 learners.

4. Discussion

4.1. Economic Impact of School Feeding on the Community

Respondents highlighted the positive economic impact of feeding programs on community members, citing the creation of employment opportunities and support for childcare, particularly in terms of nutrition. Implementing these feeding programs has led to the engagement of

certain community members as food handlers and contributors to school gardens, a practice that was especially prevalent in prior years. This initiative has, in turn, generated employment opportunities within the community. A coordinator from Gauteng emphasized this point:

“When it comes to employment, there is a definite increase. While these individuals are parents, they can now earn monthly income. This initiative undeniably contributes to job creation.”

Likewise, a food handler in KZN shared her experience:

“Since I became a part of this program, I have witnessed the transformation of women who had been struggling. The program reached out, providing employment opportunities for them. People like us, who were previously unemployed, were embraced by the program, significantly improving our ability to provide for our households.”

In addition to employment opportunities, the feeding programs also include the distribution of food parcels to assist families within the communities. A teacher from the northwest attested to the significance of this program:

“The program is precious because most students hail from underprivileged backgrounds. Many come from families led by children, as parents may not be present due to unemployment or other reasons. Some are even under the care of grandparents. The Tiger Brands Foundation occasionally extends its support by providing essential food parcels to every family.”

In conclusion, the impact of school feeding programs on communities is multi-faceted. These programs provide employment opportunities through engagement in food handling and gardening activities and extend support to families by distributing food parcels. This comprehensive approach addresses economic challenges while catering to community members’ nutritional needs, particularly children from vulnerable backgrounds.

Prior analysis using the balanced panel from the National Income Dynamic Study Coronavirus Rapid Mobile Survey (NIDS-CRAM) Waves 2, 3 and 4 (24) indicated erratic access to school meals even

across time points when schools were open. School feeding at the beginning of the 2021 academic year had neither deteriorated nor improved from the final quarter of 2020. The results from this study showed an improvement in the school feeding and better access to school meals as against the report of 2020.

4.2. In-School Nutrition Programs

Our findings, aligned with prior research (20, 21), underscored numerous families and children's struggles navigating the repercussions of COVID-19 and disruptions to school nutrition programs.

This study evaluated the two primary feeding initiatives administered by TBF and through the NSNP, as assessed by participating respondents. The interview sessions provided a platform for respondents to articulate their perspectives on the program implementations. The subsequent excerpts, originating from diverse provinces, shed light on these viewpoints:

Respondents from Gauteng conveyed that the programs encountered no glaring issues since their inception. A principal remarked, *"From its commencement day onwards, it has consistently operated smoothly."*

In KZN schools, respondents indicated that the programs took approximately one week to operate smoothly. According to one Coordinator, optimal program functionality was achieved within a week. Conversely, a Coordinator from the Western Cape highlighted that the program required nearly a month before attaining seamless operation.

This agrees with the report (17) that the school feeding programmes were running well but their effectiveness could be increased by implementing certain measures.

4.3. Challenges Encountered in School Feeding Programs

Despite the manifold advantages of school feeding programs, respondents enumerated several challenges experienced during implementation. These challenges are similar to those highlighted in other similar studies (17, 25). These challenges have been succinctly summarized and categorized as follows:

- **Facility Challenges:** Schools contend with issues such as intermittent electricity supply, inadequate water availability in certain regions, insufficiencies in transportation services, damaged equipment necessitating replacement, and constrained kitchen and storage spaces that impede workflow.

- **Human Resources:** The rotation of food handlers to provide opportunities for others to earn income necessitates recurrent personnel training. Additionally, "insufficient food handlers" were reported, with most schools operating with only seven food handlers to cater to the entire student body. This inconsistency in staff and the involvement of teachers in cooking tasks are also noteworthy challenges.

- **Financial Constraints:** While a few respondents mentioned that the majority of their program requirements are met, there are occasions when they need to supplement funds for electricity, gas, sugar. However, most schools asserted that they did not incur extra expenses.

- **Learners' Dietary Preferences:** Respondents highlighted students' preferences for meat inclusion in their meals. Other suggested additions encompass more significant quantities of milk, bread, cake, tea, diverse fruits, eggs, and chicken livers.

- **Absence of Spices in Meals:** Respondents identified a deficiency of spices in the supplied meals, resulting in a lack of flavor in some dishes.

- **Security Concerns:** Certain regions reported incidents of bandit attacks.

4.3.1. Other Challenges: Additional challenges encompass sporadic late deliveries, storage concerns, and parental resistance or lack of cooperation. Furthermore, one of the challenges to the 'nutrition argument' is that school meals will not improve a child's nutritional status if the family adjusts the food given at home, knowing the child will be fed at school (27, 28). Consequently, in order to improve the child nutrition, a take-home ration might be most effective for reaching those children who need it most (29).

4.4. Recommendations and Suggestions for Enhancing In-School Nutrition Programs

The ensuing recommendations aimed to enhance

in-school nutrition programs, bearing implications for school health policy, practice, and equity:

4.4.1. Facility enhancement consider augmenting the infrastructure with larger kitchens, dining halls, and storage areas, along with improved cooking and storage facilities, including refrigeration. These upgrades are essential to curbing food waste and ensuring the consumption of safe foods.

4.4.2. Human resources development is a pivotal step involves increasing the number of employed food handlers. Augmenting the workforce in this manner can positively impact the efficacy of the nutrition programs.

4.4.3. Improvement in food supply and preparation elevate the food supply and preparation standards. Specifically, augment lunch offerings and ensure a variety of fruits are available thrice weekly. Enhance the distribution of food parcels and diversify protein options to encompass meats and eggs.

4.4.4. Administrative refinements explore utilizing enrolment numbers instead of birth certificates for gauging the quantity of food allocations. Sustain program continuity and attract additional sponsors to fortify the feeding initiatives.

4.4.5. Rejuvenating school gardens revive the concept of school gardens to facilitate the provision of fresh herbs, fruits, and vegetables. Reinstating these gardens, which proved beneficial in the past, can contribute significantly to nutritional resources.

4.4.6. Regular and comprehensive training: It is imperative to provide ongoing training for Volunteer Food Handlers (VFHs). Training should encompass portion sizing, food preparation techniques, fundamental nutrition knowledge, and hygiene practices. This training initiative promises to elevate the quality and quantity of food dispensed within school premises.

4.5. Limitation

The current study was constrained by financial limitations, resulting in its execution in only four South African provinces. Resources were

concentrated in proximate regions due to funding constraints. A future follow-up study could extend its reach to a broader array of schools in diverse districts, thereby enhancing the breadth and depth of the investigation.

5. Conclusion

Food insecurity was exacerbated for numerous families during the COVID-19 lockdown. Individuals, families, and communities experienced the adverse effects of the pandemic, with many people losing their loved ones and jobs. Consequently, a significant number needed more access to food resources. An observed outcome was that, after the lockdown period, the quality and quantity of meals provided to children through school feeding programs differed from what they had received before the lockdown. The consistency of portions needed to be improved, and the food itself needed flavor.

The promotion of in-school nutrition programs, food parcel distribution, and social protection grants should persist, as this study has noted their substantial contribution in aiding families and children to endure the challenges posed by the global recession and pandemic. Addressing various challenges, such as inadequate school facilities and the absence of flavors in the food, is imperative to enhance the effectiveness of the in-school nutrition programs.

Authors' Contribution

Eridiong Onyenweaku: Substantial contributions to the design of the work; or the acquisition, analysis, and interpretation of data for the work, drafting the work and reviewing it critically for important intellectual content. Hema Kesa: Substantial contributions to the conception of the work, acquisition of the data for the work, reviewing the work critically for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding

This research project was funded by the Tiger

Brands Foundation.

Ethical Approval

Ethical approval for the study was applied for and obtained from the University of Johannesburg, Faculty of Humanities Research Ethics Committee. Permission to access the schools and conduct the study was sought from and granted by the Provincial Departments of Education in all four provinces. Also, written informed consent was obtained from the participants.

Acknowledgement

The authors would like to acknowledge the Tigerbrands Foundation and the Centre for Social Development in Africa (CSDA), Food Evolution Research Laboratory Fieldworkers, University of Johannesburg, for their support and immense contribution to the success of this study.

Conflict of interest: None declared.

References

1. UNICEF, WHO, World Bank Group. Levels And Trends Child Malnutrition: Key Findings Of The 2020 Edition of the Joint Child Malnutrition Estimate. Geneva WHO. 2020;24(2):1-16.
2. Dorward A, Guenther B, Wheeler RS. Linking Social Protection and Support to Small Farmer Development. FAO. 2008;1-26.
3. Thomas MC, Miller DP, Morrissey TW. Food Insecurity and Child Health. *Pediatrics*. 2019;144(4):e20190397. doi: 10.1542/peds.2019-0397. PubMed PMID: 31501236.
4. Lake L, Shung-King M, Delany A, Hendricks MK. CHILDREN AND COVID-19 ADVOCACY BRIEF Prioritise children - from response to recovery; 2021.
5. Fram MS, Ritchie LD, Rosen N, Frongillo EA. Child experience of food insecurity is associated with child diet and physical activity. *J Nutr*. 2015;145(3):499-504. doi: 10.3945/jn.114.194365. PubMed PMID: 25733465.
6. WHO. Technical paper Regional strategy on nutrition 2010–2019. Development; 2010. Available from: <https://apps.who.int/iris/handle/10665/122870>.
7. Food and Agriculture Organization. The State of Food Insecurity in the World-High Food Prices and Food Security – Threats and Opportunities; 2008.
8. Vorster H. Revised food-based dietary guidelines for South Africa: Challenges pertaining to their testing, implementation and evaluation. *South African Journal of Clinical Nutrition*. 2013;26(S):S3-S4.
9. United Nations. The Sustainable Development Goals Report; 2020. Available from: <https://unstats.un.org/sdgs/report/2020>.
10. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. *Nutr Rev*. 2012;70(1):3-21. doi: 10.1111/j.1753-4887.2011.00456.x. PubMed PMID: 22221213; PubMed Central PMCID: PMC3257829.
11. UNESCO. Education: From disruption to recovery | UNESCO; 2023. Available from: <https://www.unesco.org/en/covid-19/education-disruption-recovery>.
12. Greenhalgh T, Kristjansson E, Robinson V. Realist review to understand the efficacy of school feeding programmes. *BMJ*. 2007;335(7625):858–61. doi: 10.1136/bmj.39359.525174.AD. PubMed PMID: 17954518; PubMed Central PMCID: PMC2043412.
13. Omoni A, Rees-Thomas P, Siddiqui SA, et al. The Hidden Impact of Covid-19 on Children's Health and Nutrition: A Global Research Series; 2020. Available from: https://resourcecentre.savethechildren.net/pdf/the_hidden_impact_of_covid-19_on_childrens_health_and_nutrition.pdf.
14. Tomlinson M. School feeding in east and southern Africa: Improving food sovereignty or photo opportunity? *Regional Network for Equity in Health in Southern Africa. Syst Res*. 2007;(46). Available from: <https://www.researchgate.net/publication/252649665>.
15. DPME/DBE. Report on the Implementation Evaluation of the National School Nutrition Programme: Full Report; 2016. Available from: <https://evaluations.dpme.gov.za/evaluations/528>.
16. Shisana O, Labadarios O, Rehle T, Simbayi L, Zuma L, Dhansay A, et al. The South African National Health and Nutrition Examination Survey, 2012: SANHANES-1: the health and nutritional status of the nation. HSRC Press; 2014. Available from: <http://hdl.handle.net/20.500.11910/2864>.
17. Kristjansson EA, Gelli A, Welch V, Greenhalgh T, Liberato S, Francis D, et al. Costs, and cost-outcome of school feeding programmes and feeding programmes for young children. Evidence and recommendations. *Int J Educ Dev*. 2016;48:79-83. doi: 10.1016/j.ijedudev.2015.11.011.

18. Desai A, Smith LE, Mbuya MNN, Chigumira A, Fundira D, Tavengwa NV, et al. The SHINE Trial Infant Feeding Intervention: Pilot Study of Effects on Maternal Learning and Infant Diet Quality in Rural Zimbabwe. *Clin Infect Dis*. 2015;61(suppl 7):S710-5. doi: 10.1093/cid/civ846. PubMed PMID: 26602298; PubMed Central PMCID: PMC4657591.
19. Vermeersch C, Kremer M. School Meals, Educational Achievement, and School Competition: Evidence from a Randomized Evaluation. SSRN; 2004. doi: 10.2139/ssrn.667881.
20. Jamieson L, van Blerk L. Responding to COVID-19 in South Africa – social solidarity and social assistance. *Children's Geographies*. 2022;20(4):427-436. doi: 10.1080/14733285.2021.1924359.
21. Van der Berg S, Zuze L, Bridgman G. The impact of the Coronavirus and lockdown on children's welfare in South Africa; 2020. Available from: <https://cramsurvey.org/wp-content/uploads/2020/07/Van-der-Berg-Coronavirus-Lockdown-and-Children-1.pdf>.
22. Biro FM, Wien M. Childhood obesity and adult morbidities. *Am J Clin Nutr*. 2010;91(5):1499S-1505S. doi: 10.3945/ajcn.2010.28701B. PubMed PMID: 20335542; PubMed Central PMCID: PMC2854915.
23. Pietermaritzburg Economic Justice & Dignity Group. Household affordability index. *Found South Found Hum Rights*. 2021;159(3):398.
24. Van der Berg S, Patel L, Bridgman G. Hunger in South Africa during 2020: Results from Wave 3 of National Income Dynamics Study – Coronavirus Rapid Mobile Survey; 2021. Available from: <https://cramsurvey.org/wp-content/uploads/2021/02/10.-Van-der-Berg-S.-Patel-L.-Bridgman-G.-2021-Hunger-in-South-Africa-during-2020-Results-from-Wave-3-of-NIDS-CRAM-1.pdf>.
25. Bassier I, Budlender J, Zizzamia R, Leibbrandt M, Ranchhod V. Locked down and locked out: Repurposing social assistance as emergency relief to informal workers. *World Dev*. 2021;139:105271. doi: 10.1016/j.worlddev.2020.105271.
26. Nasreddine L, Naja F, Sibai AM, Helou K, Adra N, Hwalla N. Trends in nutritional intakes and nutrition-related cardiovascular disease risk factors in Lebanon: The need for immediate action. *J Med Liban*. 2014;62(2):83-91. doi: 10.12816/0004102. PubMed PMID: 25011369.
27. Aliyar R, Gelli A, Hamdani SH. A review of nutritional guidelines and menu compositions for school feeding programs in 12 countries. *Front Public Health*. 2015;3:148. doi: 10.3389/fpubh.2015.00148. PubMed PMID: 26301209; PubMed Central PMCID: PMC4524891.
28. Beesley A, Ballard R. Cookie Cutter Cooperatives in the KwaZulu-Natal School Nutrition Programme. *Development Southern Africa*. 2013; 30(2):250–261. doi: 10.1080/0376835X.2013.801195.
29. Korugyendo PL, Benson T. Food-for-education programs: Lessons for Uganda; 2011.