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Article

Challenges encountered in a South African school nutrition programme

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Abstract

Background: School Nutritional Programmes (SNP) provide meals at school to reduce hunger, nutrient deficiencies and improve class alertness among children in poor communities. The purpose of the research was to determine the challenges encountered in implementing the SNP in KwaZulu-Natal Province, South Africa in 2017.

Design and methods: A cross-sectional study underpinned by a concurrent triangulation research design where interviews were used to collect qualitative data from stakeholders, and a questionnaire collected quantitative data from students. The set of qualitative data was thematically analysed. Descriptive and inferential statistics were used to analyse the quantitative data. Analysis of variance (ANOVA) and Tukey HSD test were used to compare the mean scores for food quality on different days of the week.

Results: Both the quality and quantity of food were affected by delays in payment of food suppliers, lack of training of stakeholders, and poor kitchen facilities. Health problems experienced by students after eating the food made them reluctant to consume meals on some days. The Tukey HSD test indicated that the mean score for the quality of food served on Wednesday (3.2 ± 1.3) was significantly higher than the mean score for the quality of the meal served on Friday (2.5 ± 1.3).

Conclusions: Late payment of food-suppliers and inadequate training of food-handlers affected the quality and quantity of the meals. The researcher recommends that the programme administrators should improve the frequency of payment for food suppliers, training of food handlers, and find alternative meals for students who do not consume the regular meals due to various reasons.

Introduction

The Food and Agriculture Organization (FAO), International Fund for Agricultural Development, United Nations Children's Fund (UNICEF), World Food Programme, and the World Health Organisation report enormous figures of undernourished people (about 821 million) and people with micronutrient deficiencies (1.5 billion) worldwide.[1] Cases of obesity and overweight are also reported to be on the increase. In developed countries such as the USA, a School Nutrition Programme provides several meals per day to students in public schools.[2] In contrast, due to financial constraints, most developing countries can provide only one school meal per day to poor communities.

School meal programmes provide meals in schools or as take-home rations after attending school. Such programmes are implemented to fill gaps in macronutrient and micronutrient deficiencies for the children.[3] Moreover, school meals boost student learning, increase enrolment and school attendance.[4-6] More than 360 million school children worldwide benefit from such feeding schemes.[7] In the USA and O-meals programme in Nigeria, school feeding programmes are affected by a taste preference by some students who would not eat some meals because they were not appealing to them.[2,8] Moreover, small portion sizes are sometimes served. Some of the challenges of feeding programmes in developed countries such as Finland and the USA include the need to reduce high-calorie foods to curb obesity and overweight.[9] In another context, the school feeding programme in Brazil has complex and expensive logistical challenges with constant losses due to long distances.[10] Furthermore, controlling and monitoring the implementing of programmes are major challenges. Poor sanitation was also observed as a challenge in the school nutrition programmes in Brazil.[11] The school feeding programme in the State of Osun in Nigeria, has the challenge of providing rigid meals, due to the seasonal availability of food which compromises the quality, as well as the quantity of food.[12] Price increases, due to the change in seasons, determine the availability of food. Furthermore, small scale farmers are not organisationally structured, and they have limited involvement due to inaccessibility to adequate fertilisers, a lack of skills and technology, lack of improved seed varieties and irrigation. In addition to insufficient capital and uncompetitive products,[8] the lack of skills, technology and inputs were also evident in the Kenya School Feeding programme where the smallholder farmers had to be linked to Agricultural Extension Officers for advice on farming, as well as organisations that provided agricultural inputs. The challenges encountered in the school nutrition programmes make them less inefficient. The problem of infrastructure exists in many countries in the middle- and low-income groups such as those in Ghana.[13] The problem of maintaining nutritional quality and quantity is also experienced in the Ghana School Feeding Programme, where there were no guidelines for both quantity and quality of ingredients to be served.[8] Cooking in some Ghanaian schools is done under the trees. Fernandes *et al*. asserted that micronutrients (vitamins and minerals) in the Ghana School Feeding Programme did not meet international recommendations.[14]

A meal planner tool was implemented in some Ghanaian schools with the intention to assist in providing meal standard specifications. However, some Ghana School Feeding programme

Significance for public health

The school nutrition programme plays an important role in reducing hunger and nutrient deficiencies. It improves learners' cognitive level by providing critical nutrients and improves alertness in class, ensuring that learning is optimal. Therefore, it is essential to identify the challenges that affect the programme so as to devise measures to lessen the obstacles to enable learners from poor communities to derive the maximum benefit from the programme.

participants did not have sufficient nutritional knowledge to use the meal planner tool.[14] Therefore, they found it challenging to work with the meal planner tool to determine appropriate combinations and quantities of foods. They recommended more user-friendly measures such as serving ladles, paint buckets and wooden blocks for fish and meat to ensure that the correct amount of the food was served.[14]

Several studies carried out in South African primary schools indicate that challenges seem to exist in the implementation of the National School Nutrition Programme (NSNP). One such might be the absence of infrastructure. In South Africa, researchers identified an absence of kitchens in the Eastern Cape- and Mpumalanga schools.[8,15,16] Bundy et al. and Berejena et al. reported an absence of storage, preparation, cooking and eating facilities that meet health and safety standards in schools in South Africa.[8,17,18]

Food handlers and caterers in the Sedibeng West district of Gauteng and in the Fezile Dabi district in the Free State also reported their frustration with a lack of contractual continuity.[19] These uncertainties frustrate suppliers, and it proves difficult for them to get employment elsewhere. Occasionally food handlers become reluctant to be involved in additional duties due to the frustrations they experienced in the past when the contract expiry date approached. Drake *et al*. noted that food handlers and principals in Eastern Cape felt that the national school nutrition programme was a burden to them.[8]

A number of South African schools that have kitchens also disregard the safety standards provided in the NSNP safety directory.[15] In some of the schools, the gas cylinders were kept inside kitchens.[16] The involvement of community members in the programme activities like management and implementation was infrequent.[15] Policies are dictated to them, depriving them of the opportunity to share their divergent views.[20] The department only communicates with the schools through meetings held with school principals who were to share the information with other stakeholders. In the National School Nutrition Pogramme in South Africa, provinces must comply with minimum norms and standards regarding nutrition quality, quantity and food safety.[18] This was to be achieved by each province having to provide a quarterly report to the national treasury on nutritional quality, quantity, and food safety. Several studies carried out in different provinces of South Africa indicated problems of various magnitudes associated with the programme.[9,16-19] Out of these studies, only a few focused on the KwaZulu-Natal province, and none of them was based on school feeding programmes in the Pinetown District. Furthermore, the existing literature on this topic report on studies in single primary schools. Therefore, there seems to be a gap in the literature concerning high schools.

The focus of the study was KwaZulu-Natal province because it has the highest number of paternal orphaned children (10.7%), the highest percentage of households of at least six members in the family (20.3%)[21] and the highest number of social grant recipients (4,090), hence, the largest proportion of learners is likely to benefit from the programme.[21] The fact that so many poor learners may fail to access school meals is disconcerting, considering the benefits of such feeding programmes and the large sums of money invested in them.

The information on challenges can assist researchers or organisations who may want to investigate issues of implementation of the school nutrition programmes in different countries. School Food programmes such as the NSNP can also be useful as policy instruments for achieving the Millennium Development Goal of reducing hunger in developing countries.

Design and Methods

In concurrent triangulation, the researcher gathered both qualitative and quantitative data simultaneously. Findings of both methods were integrated during data interpretation to provide a comprehensive analysis of the research problem so as to strengthen the research results.[20-22]

Population and sampling techniques

The Molweni circuit situated in Pinetown district was purposely and conveniently selected for this study's qualitative data population. Molweni circuit consists of three secondary schools in the quintile two-bracket while five secondary schools are in quintile three. Although the food supply is expected to be the same, the learners in quintile two schools come from a poorer community than schools in quintile three. The quintile system determines the poverty level of the community, with quintile one schools in the poorest communities, while quintile five schools, being in the most affluent communities. The data for the project was collected between June and September 2017.

The qualitative population consisted of eight each of the NSNP teacher coordinators, principals, service providers, and thirty food handlers in the eight secondary schools in Molweni Circuit. Two district officials were also part of the qualitative population. The qualitative sample comprised one NSNP teacher coordinator, four principals, seven service providers, and six food handlers in the five purposely selected secondary schools in Molweni Circuit. Two district officials were also involved.

The researchers conducted face-to-face in-depth interviews with a semi-structured interview guide. Participants required variable timeframes due to their different time schedules. An interview guide with standardised questions (Table 1) was used to ensure that questions based on the study objective were answered entirely, and

Table 1. Interview guide on the challenges encountered in the implementation of the school nutrition programme.

Briefly explain how the following situations and conditions may be challenges in the school nutrition programme:
• Are there any challenges regarding the payment of stakeholders?
• Are there any challenges in terms of quality and quantity of food served in the school nutrition programme?
• Do you sometimes have problems of gas shortages?
• Do the schools sometimes fail to provide food for the NSNP? State the reasons for the failure.
• Are there sometimes some delays in serving the food? State the reason for the delays.
• Are there any challenges to food handlers and food suppliers of having limited relevant skills and knowledge to promote good implementation of the NSNP?
• Are there any challenges of training or induction programmes for new food handlers and service providers on the NSNP roles?
• What other challenges may there be for teacher coordinators, food handlers, learners, gardeners and principals in the implementation of NSNP?

time was not wasted on irrelevant questions.

The quantitative data necessarily provided details that could not be supplied by other stakeholders who are not beneficiaries of the programme. Furthermore, it confirmed some of the qualitative data from other stakeholders, making the results more reliable. The quantitative population consisted of 316 boys and 369 girls, totalling 685 learners in grade twelve amongst eight schools. The study stratified these schools into quintile two and quintile three, with learners distinguished between males and females. Slovin's formula was used to calculate the sample size: n = N/(1 + Ne2).[22] n = 685/[1 + 685(0.1)2] = 87. Where n = sample size, N = total number of learners in grade 12 in the 8 schools, e = desired margin of error. The Slovin's formula is suitable when the population's behaviour is unknown. The sample was selected through systematic random sampling drawn from class registers. The researcher selected every fifth learner from each starting point in the register. This gave a total of 137 learners who were given parental consent forms which were signed by parents or guardians. Only 108 learners who returned the parent consent forms participated in the study.

The final sample represented the population with 108 learners comprising forty-five boys and sixty-three girls, with more than fifteen per cent of the learners in the quantitative population. The learners completed a structured questionnaire in the presence of the researcher to collect the quantitative data. The questionnaire was based on a five point likert scale: strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. The respondents (learners) had to indicate their level of agreement with various aspects which include: quality and of food quantity, availability of food, delays in serving the food, consistency in the type of menu served, problems associated with eating the food from the SNP, culture or beliefs and food preference inhibiting food intake.

Content validity was ensured through data source- and method triangulation. External validity was also achieved by random sampling of respondents across several strata (males and females in quintiles two and three in the commerce, science and humanities classes) that reflected the population to which the results were generalised.[23] External validity was also ensured by having a representative sample size of more than fifteen per cent of the population size. Member checking, with the data and findings of the data analysis being brought back to the original participants to seek their input concerning the accuracy, completeness and interpretation of data ensured the credibility of the study.[24] The researcher also spent ample time with participants and maintained thorough, phenomenon-focused observations. It was further ensured through data and method triangulation.

The test-retest procedure where sections of the research instrument were tested by being subjected to the same subjects twice to check the consistency of data ensured reliability. Correlation coefficients were calculated to compare learners' responses on related issues, which under normal circumstances, would yield almost similar responses if learners gave their response objectively. The survey items showed ordinal scale data which was tested for consistency by way of Spearman's correlation coefficient.[25] These questionnaires were analysed using the Statistical Package for Social Sciences (SPSS) and thereafter used to calculate frequencies, percentages and the mean of learners according to their responses on the questionnaire that was finally presented in tables. One-way analysis of variance was used to determine if there was any significant difference on the mean scores for the quality of food served on different days of the week. Levene's test for homogeneity of variance indicated no significant difference (p=0.07). Hence, the homogeneity of variance was assumed. The Tukey *post-hoc* multiple comparison test was then performed.

Thematic content analysis by coding and categorising data was used to analyse the qualitative data obtained from the interviews with the results presented in narrative texts and tables. Data from document analyses and observations were also categorised and tabulated, while some of it was in a narrative form. The quantitative and qualitative data were synchronised during analysis.

For ethical considerations, the researcher introduced himself to the respondents and participants and clarified the purpose of the study. Research respondents participated voluntarily and signed informed consent forms before the data collection process ensued. Respondents and participants were informed that they were free to withdraw any time from participation in the study without consequences or victimisation. Only respondents with signed parent consent forms were involved in the study.

An ethical clearance certificate number MAP111SMAF01 was obtained from the University of Fort Hare. Permission to collect research data was requested from the Provincial Head of Department in KwaZulu-Natal Education Head Office (Ref: 2/4/8/1189). The researcher then requested permission to conduct research from the respective district managers, circuit managers as well as school principals.

Results from the qualitative data

The qualitative data gathered through in-depth interviews with various stakeholders of the school nutrition programme highlighted four major themes namely late payment of service providers, delays in feeding, food preferences and cultural differences, and the lack of sufficient training for stakeholders. Abbreviations that will be used in this section include: FB, FD = Food handlers from schools B and D; SB = food supplier for school B; PC, PD, PE = Principals for schools C, D and E; TC = Teacher coordinator for school C; DO = Departmental official.

Late payment of service providers and suppliers' contract submission

Overdue payment affected many of the service providers, resulting in a negative impact on the quality of services provided to learners. Although all the service providers signed contract forms to bind them to provide food every day, quality service could not be guaranteed because of payment delays, sometimes stretching up to five months or more. Late payment is mainly due to the bureaucratic procedure, which had to be adhered to before payment is made. The overdue payment, as well as the limited budget, had a markedly negative impact on the quality and quantity of the supplied food. According to the participants, fruit is also rarely included. However, the bureaucracy was not the only cause for overdue payments. Schools also submit contract forms late. One of the participants reflected that:

"There is a problem of submission of contract forms to the department. It's disappointing that we have the contract and it will not have been submitted to the department by the principal. The principals do not take things seriously to do all the necessary administrative work to ensure early payment (SB new)."

The delays in payment could result in food not being supplied or inadequate quantities of food are supplied. Late payments of suppliers probably caused this. One of the participants had this to share:

"In the past, there were days when learners would go without a meal. The food delivered was insufficient, and the service providers were not paid and consequently, they could not afford to buy food for the school (PE)."

Another participant reiterated the problem with food delivery failure. This, the participant added, was sometimes also caused by

a shortage of gas for cooking, due to the late delivery of the gas by the food suppliers. The participant commented that:

"Sometimes it is a problem of unavailability of gas. We do not cook when the gas is not available (FD)."

The delivery of insufficient quantities of food was confirmed by a participant from a different school. The participant reflected that:

"Sometimes the service provider will say: 'The department has not paid me. I can't provide students exactly as they should be provided'" (PC).

The problem of insufficient quantities seemed to be more serious in one of the schools. It is possible that the amount to be supplied to the school was not correctly determined according to the available guidelines, or that the supplier serviced too many schools, making it impossible to provide sufficient quantities in all the five school days. One of the participants at the school commented that:

"The food is not enough for the whole school enrolment in all days. The supplier alleges that he was told to supply the amount being supplied. As I see it, the food is not enough for the whole school (TC)."

Observations made at this school confirmed the absence of sufficient quantities of food on the three consecutive days from Monday to Wednesday. Furthermore, cooking was done in a dark room without electricity, and there was no nearby tap for cleaning dishes either, or for students to wash their hands before they were served with food. The environment around the kitchen was dirty and flies were seen roaming around as the food handlers poured some of the dirty water on the ground around the kitchen. There was also no sink for cleaning dishes outside the kitchen; no fruits were served on any of the days visited by the researcher, and food handlers did not have protective clothing.

The problem of insufficient quantities was further confirmed by the district official. He made it clear that there might be more learners in a school than budgeted for by the school NSNP. The official observed that:

"There is usually a challenge on quantities of food supplied. The challenge arises because the number of learners stated and that the school will be approved of, will be less than the actual number of students present at the school. Any students who will be enrolled after the first ten days will not be considered for the school budget in the nutrition programme (DO)."

Delays in feeding

The poor delivery of food, strained relationships among stakeholders. One of the principals bemoaned the fact that:

"The supplier is sometimes not reliable ... the new one is good. But the former one-uuuh, aaah. Sometimes, if there is a problem between the food handlers and the supplier because of poor delivery of the food, the food handlers become angry and overreact to the teacher coordinator (PD)."

The delays in food supply also affected the proper functioning of the school. Adjustments in school activities had to be made to accommodate the delays in serving the meal. One of the participants stated:

"The challenge of the principal is when the food is not delivered on time. The timetable has to change to accommodate the feeding time (SE)."

Food preference and culture

There were also challenges of food preferences among schools. A product which may be good for one school might not be liked by another. One participant had this to share:

"At some point, there are problems of food preference. When you get to a new school, they don't like the same rice that you supply at one school (SE)."

One of the participants highlighted the importance of background in determining food choices. He commented:

"Sometimes the choice of food is determined by their background. If they don't eat soya mince at home, it will be difficult for them to eat it at school (DO)."

Another participant mentioned culture, sickness or allergies as some of the factors that resulted in the avoidance of certain food items. The participant said:

"Some say they have taken the Zulu medicine and they are not allowed to eat fish. Some say beans makes them sick as they had stomach problems after eating (FB)."

Unfortunately, there were no alternative meals. One of the participants reflected that:

"Students complained about soya mince and rice on Tuesdays and Thursdays. There were no alternative meals for learners who did not like the standard meals (SE)."

Lack of sufficient training of stakeholders

There was a challenge among food handlers who sometimes failed to attend training workshops. One of the participants commented that:

"There is a challenge for workshop attendance. Sometimes the venue is not accessible. Some principals do not transport food handlers. Some food handlers do not attend due to logistical problems. This, in turn, results in food handlers lacking cooking techniques while service providers lack business skills (DO)."

Quantitative results

Findings from the qualitative data portrayed that there were many challenges associated with the implementation of the NSNP. To complement these findings, the researcher saw it necessary to include quantitative data from learners who were the main beneficiaries of the programme. The challenges are presented in Table 2 and elaborated on in the subsequent sections.

Quality and quantity of food

The study findings indicate that the quality of food was generally low (overall mean 2.9) with the lowest quality being recorded on Wednesdays (mean=3.2, SD=1.26) and the best quality on Fridays (mean=2.5, SD=1.33). One-way analysis of variance (Table 3) indicated that there was a significant difference on the mean scores of the quality of food at $p<0.05$ level over the five days of the week [$F(4, 487) = 3.98$, $p=0.003$]. *Post-hoc* comparison using Tukey HSD test (Table 4) indicated that the mean score for the quality of food served on Wednesday (mean=3.2, SD=1.3) was significantly higher ($p=0.002$) than the mean score for the quality of the meal served on Friday (mean=2.5, SD=1.3). However, the mean scores for the quality of food served on other days did not show significant differences ($p>0.05$).

The food quantity was relatively low on Mondays (mean=3.1, SD=1.55), Thursdays (mean=3.0 SD=1.33) and Fridays (mean=2.9, SD=1.47). The least complaints about the quantities of food were received on Wednesdays (mean=2.7, SD=1.27) when the schools prepared rice and samp. A large proportion of learners

Table 2. Challenges and learners' level of agreement to the associated challenges.

Challenges	Learners' level of agreement to the associated challenges						
Food is of poor quality on the following days	**Strongly agree 5**	**Agree 4**	**Neither agree nor disagree 3**	**Disagree 2**	**Strongly disagree 1**	**Mean**	**SD**
Monday	21 (19.4)	16 (14.8)	25 (23.1)	20 (18.5)	23 (21.3)	2.9	1.43
Tuesday	9 (8.3)	17 (15.7)	30 (27.8)	28 (25.9)	16 (14.8)	2.8	1.19
Wednesday	18 (16.7)	26 (24.1)	31 (28.7)	14 (13.0)	13 (12.0)	3.2	1.26
Thursday	15 (13.9)	14 (13.0)	35 (32.4)	22 (20.4)	13 (12.0)	3.0	1.22
Friday	22 (20.4)	8 (7.4)	28 (25.9)	14 (13,0)	28 (25.9)	2.5	1.33
					Overall mean	2.9	
	One-way analysis of variance to check if there was a significant effect on the quantity of a meal served				F (4, 487) = 3.98, p=0.003.		
Food is low in quantity on the following days							
Monday	31 (28.7)	8 (7.4)	24 (22.2)	13 (12.0)	24 (22.2)	3.1	1.55
Tuesday	11 (10.2)	15 (13.9)	29 (26.9)	21 (19.4)	22 (20.4)	2.8	1.34
Wednesday	16 (14.8)	13 (12.0)	30 (27.8)	18 (16.7)	21 (19.4)	2.7	1.27
Thursday	20 (18.5)	12 (11.1)	31 (28.7)	22 (20.4)	16 (14.8)	3.0	1.33
Friday	20 (18.5)	10 (9.3)	21 (19.4)	16 (14.8)	30 (27.8)	2.9	1.47
					Overall mean	2.9	
Food is sometimes not available	26 (24.1)	42 (38.9)	12 (11.1)	13 (12.0)	11 (10.2)	3.6	1.28
There are sometimes delays in serving the food	32 (29.6)	44 (40.7)	8 (7.4)	7 (6.5)	14 (13.0)	3.7	1.33
A different menu is served than what was expected	23 (21.3)	26 (24.1)	20 (18.5)	17 (15.7)	22 (20.4)	3.1	1.43
I have health problems after eating some of the food.	19 (17.6)	22 (20.4)	16 (14.8)	21 (19.4)	30 (27.8)	2.8	1.48
The food served on some days interferes with my culture/ beliefs	11 (10.2)	8 (7.4)	27 (25.0)	12 (11.1)	50 (46.3)	2.3	1.37
I just don't like the taste of some of the food	44 (40.7)	29 (26.9)	11 (10.2)	15 (13.9)	9 (8.3)	3.8	1.33

Numbers 1 to 5 indicate the level of agreement to the associated challenge with 1 representing Strongly disagree and 5 Strongly agree. The number outside the brackets shows the actual number of learners who gave that response, while the number in brackets presents the percentage of learners' responses.

Table 3. One-way analysis of variance to show if there was a significant effect of the type of meal served on the quality of food.

	Sum of squares	df	Mean square	F	Sig.
Between groups	26.519	4	6.630	3.979	0.003
Within groups	811.406	487	1.666		
Total	837.925	491			

df, degree of freedom; F, F-value which is the ratio of mean squares (6.630/1.666); Sig. is the p-value or the significance of the difference under the comparison method being used at 5% significance level.

Table 4. *Post-hoc* comparison of food quality on different days using the Tukey HSD test.

(I) Day of the week	(J) Day of the week	Mean difference (I-J)	Sig.
Monday	Tuesday	0.175	0.872
	Wednesday	-0.293	0.481
	Thursday	-0.037	1.000
	Friday	0.417	0.170
Tuesday	Wednesday	-0.468	0.077
	Thursday	-0.212	0.776
	Friday	0.242	0.702
Wednesday	Thursday	0.256	0.624
	Friday	0.710*	0.002
Thursday	Friday	0.454	0.115

The mean difference is the difference of the mean values of quality for the responses for the two days. The rounded mean values are shown in Table 2. Sig. is the p-value or the significance of the difference under the multiple comparison method being used with the mean difference being significant at the 0.05 level; *point where the difference was significant.

did not welcome rice and samp because of stomach problems they experienced after consumption, which created this surplus. Forty one (38.0%) of the students confirmed that they experienced problems after eating some of the food. A correlation coefficient of 0.82 indicated good reliability between the learners' responses for Tuesdays and their corresponding responses for Thursdays, when a similar meal was served.

Food delays, availability and taste

Table 2 indicates that culture or beliefs (mean=2.3, SD=1.37) are not considered by the majority of learners as barriers to the consumption of the NSNP. Nineteen (17.6%) confirm that cultural beliefs inhibit them from consuming some of the food. However, the results point to the unavailability of the food and taste dislike (mean=3.6, SD=1.28; and mean=3.8, SD=1.33) as major perceived barriers, inhibiting learners' consumption of school meals. A large proportion of the respondents 68 (63%) affirmed that food is sometimes not available, while 73 (67.6%) confirmed that they do not eat some of the food due to taste preference. Although delays in serving the food (mean=3.7, SD=1.33) may not always act as barriers to food consumption, they sometimes interfere with the school timetable and may result in losses of a substantial amount of learning and teaching time.

Discussion

There were many challenges encountered in the national school nutrition programme. This is consistent with the reports from several studies carried out in South African schools.[9,16-19] Research findings revealed that some of the service providers were supplying food to three or more schools with enrolments of not less than 500 learners each. If the service providers were disadvantaged members of the community who had formed co-operatives, the co-operatives could hardly supply food without receiving payment for five months, unless they were backed by some prominent business persons or they had access to food on credit from wholesalers. Previous studies indicated that community members are not involved in decision making and programme implementation.[15,20] The bureaucratic system leading to late payments seemed to be crippling the programme, as was also observed in Langsford's study.[26] Langsford describes the bureaucratic system as a chain that hinders itself from achieving its aims.[26] This could be described as a suicidal effort, as it severely compromises the efficiency of the programme. The researcher strongly concludes that there are better ways to prevent corruption and to ensure that the programme runs smoothly than to delay payments of service providers. Delays in payment have a serious negative impact on the implementation of the programme. It is critical to involve the service providers in making decisions about the frequency of their payment to ensure the smooth running of the programme. In Ghana, delays in payment of food suppliers hindered them from purchasing food in bulk to evade seasonal price hikes.[8] Delays may result in non-delivery of food items as were reported by some participants and respondents in the study, and affirmed in Kwatubana and Makhalamele's South African study.[19] Regular meetings with stakeholders may be critical in finding solutions for late payment of stakeholders. Participants in this study, and as also observed in the study by Kwatubana and Makhalamele make it clear that where service providers were reported to be unreliable, the schools lose confidence in the supplier.[19] Effective monitoring and communication may be crucial in ensuring the reliability of stakeholders. Late payment of service providers could also result in delays in serving meals, as was reported by participants and respondents in this study and affirmed in Dei's South African study.[27] The delays may interrupt the school timetable. Late payment of service providers can also compromise the quality and quantity of the food.[8,12,18] In other studies lack of funding resulted in the irregular food supply, lack of variety, and absence of fruit and vegetables.[18,20]

Kwatubana and Makhalamele's, and Overy's studies further affirmed the problems associated with delayed payment of food supplier and poor monitoring, as they revealed that food was sometimes insufficient and vegetables were not always fresh.[19,28] Older vegetables are cheaper than fresh ones because prices of perishable commodities decrease as they lose their freshness. If service providers are not paid on time, they may opt for cheaper, older vegetables in an effort to meet the programme demands. Acording to the regulations, provinces must comply with minimum norms and standards regarding nutrition quality and quantity and food safety.[18] Non-compliance with standards such as quality and quantity of meals should result in severe consequences such as a reduction of the total payment. However, this is only possible when there is effective monitoring of the programme.

As was also observed by Rendall-Mkosi, Wenhold and Sibanda, this study's findings revealed that some learners choose not to eat school meals on some of the days.[16] This was consistent with the studies in the USA and O-meals programme in Nigeria's school feeding programmes where some students could not eat some of the meals due to a taste preference.[2,8] Abstinence from eating the school meals might probably be due to low meal quality. A number of respondents reported that meals were not well cooked and they sometimes had stomach problems after consumption. According to Bundy et al. and Berejena et al. failure to cook properly and health problems could be due to the absence of storage, preparation, cooking and eating facilities that meet health and safety standards in schools in South Africa.[8,17,18] A lack of food handlers' training and compromised hygiene might also result in low food quality. The incidence of stomach problems needs to be investigated to ensure that learners benefit fully from the programme. Stomach problems often result in diarrhoea and the loss of body nutrients. Both the Department of Education and Lacey claim that the objectives of eliminating short-term hunger, enhancing learners' alertness in class and addressing the issue of micronutrient deficiency will not be achieved if illnesses result from eating school meals.[19,21] Insufficient sanitation standards are not only a South African issue. In Brazil, as well as Ghana, poor sanitation in the school nutrition programmes was a challenge.[8,11,29]

This study focused on a small geographical area in one province of South Africa which uses a centralised procurement model. This limits the generalisation of the results.

Conclusions and recommendations

Although most of the findings concurred with the studies that were conducted in primary schools, this study was able to single out late payment of service providers as a major impediment in the implementation of the school food programme. This factor and lack of training for food handlers ultimately affected the quality, quantity, variety and the taste of food. Food handlers were dissatisfied with their stipend. Furthermore, the findings conclude that learners' food intake was partly affected by their food preference, background and culture.

The researcher recommends that the programme administrators should improve the frequency of payment of food suppliers, training of food handlers, and find alternative meals for learners

who experience health problems after consuming the regular meals. More research focusing on different provinces, as well as the decentralised procurement model, need to be conducted to get a more comprehensive picture of the NSNP challenges in different provinces of South Africa.

Developing a Simplified Standardised Meal Planner Tool where an input of the number of learners present will yield an output with the combinations of quantities of food items to prepare, could significantly improve the quality of the school meals. Developing an application to record food delivered, and communicate weekly food expenses to the relevant stakeholders should be devised. Effective training of food handlers to use the Meal Planner Tool and to ensure maximum hygiene can help to improve the quality of the meals. Videos or a phone application on the preparation of different meals can be made available to the schools to assist food handlers who sometimes fail to attend workshops.

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References

1. FAO, IFAD, UNICEF, WFP, WHO. The state of food security and nutrition in the world: Building climate resilience for food security and nutrition. Rome: FAO; 2018.
2. Hayes D, Berdan G. School nutrition programs: challenges and opportunities. Am J Lifestyle Med 2013;7:333-40.
3. Jomaa J, Mcdonnell E, Probart C. School feeding programs in developing countries: impacts on children's health and educational outcomes. Nutr Rev 2011;69:83-98.
4. Bashir S, Lockheed M, Ninan E, Tan JP. Facing forward: Schooling for learning in Africa. Washington, DC: AFD & World Bank; 2018. p.127-133.
5. Bundy DAP, de Silva N, Horton S, et al. Optimizing education outcomes: High-return investments in school health for increased participation and learning. Disease Control Priorities, Vol 1. World Bank Group; 2018.
6. Kristiansson EA, Gelli A, Welch V, 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.
7. World Food Programme. School meals. 2016 [cited 2019 Nov 22]. Available from: http://www.wfp.org/school-meals/wfp-school-meals
8. Drake L, Woolnough A, Burbano C, Bundy D. Global School Feeding Sourcebook Lessons from 14 countries. London: Imperial College Press; 2016.
9. 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.
10. Otsuki K. The local food revolution in Brazil's schools. Countercurrents [Internet]. 2013. [cited 2019 Apr 30]. Available from: http://countercurrents.org/otsuki060113.htm.
11. Medeiros IMS, Lima SG, de Almeida Maffi B, et al. Inadequacies in good manufacturing practices and high health risks are still problems in food production in public preschools and day-cares in Rio Branco, Acre, Western Brazilian Amazonia. Adv Food Technol Nutr Sci Open J 2015;1:S38-46.
12. The Partnership for Child Development. Elementary School Feeding and Health Programme Transition Strategy: State of Osun, Nigeria. 2012.
13. Okae-Adjei S, Akuffo B, Amartei C. Ghana's school feeding programme in perspective: A case study of the Akuapem North Municipality in the Eastern Region. Int J Technol Manag Res 2016;1:31-41.
14. Fernandes M, Galloway R, Gelli A, et al. Enhancing linkages between healthy diets, local agriculture, and sustainable food systems: the school meals planner package in Ghana. Food Nutr Bull 2016;37:571-84.
15. Hochfeld T, Graham L, Stuart L, Gent MY. Evaluation study of the National School Nutrition Programme and the Tiger Brands Foundation in-school breakfast feeding programme in the Lady Frère and Qumbu districts of the Eastern Cape, Centre for Social Development in Africa. Johannesburg: University of Johannesburg; 2015.
16. Rendall-Mkosi K, Wenhold F, Sibanda, NB. Case study of the National School Nutrition Programme in South Africa. Pretoria: Partnership for Child Development; 2013.
17. Berejena T, Kleynhans IC, Vibetti SP. Challenges of the secondary school nutrition programmes in the City of Tshwane, South Africa. Afr J Phys Activ Health Sci 2018;24:233-44.
18. Lacey G. Guidebook to education in the Commonwealth. London: Commonwealth Secretariat; 2012.
19. Kwatubana S, Makhalamele T. Parental involvement in the process of implementation in the process of implementation of the National School Nutrition Programme in Public Schools. Int J Sci Educ 2015;93:315-23.
20. Quila VE, Tyilo N. Implementing the National School Nutrition Programme: How involved are stakeholders.

Mediterr J Soc Sci 2014;5:381-90.
21. Statistics South Africa. General Household Survey. Pretoria: Statistics South Africa; 2018.
22. Ryan TP. Sample size determination and power. Hoboken: John Wiley & Sons; 2013.
23. Ridenour CS, Newman I. Mixed method research: Exploring the interactive continuum. Carbondale: Southern Illinois University Press; 2008.
24. Mcnee CL, McCabe S. Understanding nursing research in evidence-based practice, 2nd ed. Philadelphia: Lippincott Williams and Wilkins; 2008.
25. Schober P, Boer C, Schwarte LA. Correlation coefficients: Appropriate use and interpretation. Anesth Analg 2018;126:1763-8.
26. Langsford C. Enough on our plate? The national school nutrition programme in two schools in Katlehong, South Africa. Thesis dissertation. Johannesburg: University of the Witwatersrand; 2012.
27. Dei FA. An evaluation of the school feeding programme: a case study of Magog primary school. Thesis dissertation. Pretoria: University of South Africa; 2014. Available from: http:www.uir.unisa.ac.za/bitstream/handle/10500/18779/dissertation_dei_fa.pdf?sequence
28. Overy N. An Evaluation of the School Nutrition Programme in the Grahamstown Education District, Eastern Cape, South Africa. Grahamstown: Rhodes University; 2010.
29. Maijers W, Nalla VR. Analysis of supply chain studies for home grown school feeding, Procurement Governance for Home Grown School Feeding Project learning series #2. Alkmaar: Netherland Development Organisation; 2014.