



Research Article

Evaluation of the Nutritional Status of School-Children in the Atlantic Department of Southern Benin who Benefit from the National School Canteens Program

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Abstract

Background and Objective: The problem of food insecurity and malnutrition, although international in scope, affects poor countries located mostly in sub-Saharan Africa and more importantly, rural populations, without concealing the consequences of these scourges. The nutritional situation of Beninese children in rural areas is not at its best. It is at the root of low enrolment rates, including its negative impact on local development. The results of this research had shown that school canteens can help to improve living conditions, thus contributing to local development. In this way, the introduction of canteens aims to combat school wastage and thus encourage children to stay in school. Assessing the nutritional status of children benefiting from school canteens aims to ensure that they receive adequate nutrition to support their health, well-being and academic success. The aim of this study was to help improve the health of children in elementary school through their catering by assessing the nutritional status of elementary school children in the Atlantic department. **Materials and Methods:** The equipment used to carry out this study consisted of scales, a metre for measuring anthropometric parameters in accordance with WHO standard practice and a survey form. To measure weight, a Seca mechanical scale accurate to 0.01 kg was used and the children wore their khaki outfits but removed their shoes. For height, a portable stadiometer accurate to 0.001 m was used. Pupils' ages were obtained from their birth certificates and, if these were not available, the date of birth was reported either by the parents, teachers or principals, or by the pupils themselves. It is therefore possible that the data collected may contain errors, These included errors in reading measurements, non-compliance with certain rules for proper measurement and age estimation in children without birth certificates. The parameters studied were: Weight, height, median cranial and gill circumference of schoolchildren. **Results:** It was observed that the median of all parameters from the start of the canteens onwards increased significantly after the resumption of school canteens ($p < 0.05$). This study has shown the important role played by school canteens in local development. School canteens are more than just strategic instruments, they are a lever for development. School canteens help to improve conditions of physical and mental well-being and hence learning, for schoolchildren. In fact, the provision of food in schools has a dual effect: On the one hand, the nutrition and health of pupils is improved; on the other, canteens make a major contribution to keeping pupils, especially young girls, in the classroom. **Conclusion:** Canteens improve academic performance and reduce school dropouts. The advantages of school canteens are well known and in order to supply agricultural products to the canteens, the supply mechanism must be defined clearly and formally.

Key words: Atlantic, Benin, food insecurity, malnutrition, school canteens

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

A diversified diet is necessary to provide the body with the essential nutrients it needs to function. School feeding programs are generally considered to be primarily educational interventions facilitating equal access to education and learning opportunities and when they take nutrition issues into account, they promote the nutrition and health of schoolchildren. Particularly when school feeding is part of broader educational strategies, it can help maximize the return on investment in education and reduce poverty in the long term. There is a growing global drive to provide quality meals for children while stimulating local agriculture and economies through the purchase of food from small local producers¹.

In Benin, not all children who go to school are well fed at home and this is a major obstacle that needs to be addressed. In the search for adequate solutions to these problems, school feeding, through canteens, has been identified as one of the main measures capable of promoting access, keeping learners in school and helping to improve their performance, particularly in rural areas².

Having a school canteen is a real asset for a school. It means better attendance in the afternoon and better learning for children. Children don't have to go home at lunchtime, whereas in the past, pupils living far away were often late for afternoon classes, if at all. What's more, after a good meal, children are more attentive in class. As a result, the schools' pass rates for promotion to the next grade have risen³.

Numerous studies have examined the factors that explain wastage and learner performance. With regard to school factors, most studies point the finger at school infrastructure (classrooms, kits, seating capacity, etc.), teacher recruitment and training⁴⁻⁶. They unequivocally affirm the difference in school statistics between well-off households and those with precarious living conditions⁶. Poor households would find it difficult to keep track of their children's schooling and would often be obliged to leave them at home or send them out to work in the fields. However, very few studies have focused on the preponderant role of school nutrition on academic performance and student retention in the school system. School feeding has a dual purpose. It aims to combat child malnutrition.

Food insecurity and malnutrition are not emerging problems. They affect every country in the world, particularly those in sub-Saharan Africa. It is said that "a hungry stomach has no ears". Children without access to a nutritional diet of sufficient quality and quantity find it harder to learn.

Benin, convinced of the multiple benefits of food security, has set up social aid schemes for students, school canteens and university works. It is within this framework that the Programme National d'Alimentation Scolaire Intégrée (PNASI) was initiated for the 2017-2022 period. This school feeding program is funded by the Beninese government, Catholic Relief Services (CRS), World Food Programme (WFP) and the Global Partnership for Education (PME). School canteens are expanding rapidly, particularly in food-insecure and vulnerable areas, in order to boost enrolment, retention and performance. Moreover, in the absence of comprehensive documentation and references on school canteen coverage and more specifically on its outputs likely to improve school retention and performance, we feel that it is extremely timely, through the present study, to reflect on the impact of school canteens on school retention and performance. We are particularly interested in the following questions: How widespread are school canteens in Benin? What is the impact of canteens on the retention of Beninese pupils? Does the school canteen program affect students' academic performance? What is the situation according to gender? Is there a significant difference between: Weight, height, median cranial and branchial perimeter of schoolchildren?

MATERIALS AND METHODS

Our study involved pupils in public elementary school benefiting from the National School Canteen Program in the Atlantic Department (Benin).

The material used for the study consisted of scales, a metre for measuring anthropometric parameters according to WHO standard practices and a survey form. In line with the program's objectives, Benin's school feeding program has a significant effect on school enrolment and performance, both in terms of quantity (average length of schooling) and quality (cognitive faculties and school results).

To measure weight, a Seca mechanical scale accurate to 0.01 kg was used and the children wore their khaki outfits but removed their shoes. For height, a portable stadiometer accurate to 0.001 m was used. Pupils' ages were obtained from their birth certificates and, if these were not available, the date of birth was reported either by the parents, teachers or principals, or by the pupils themselves. It is therefore possible that the data collected may contain errors, including errors in reading measurements, failure to follow certain rules for taking correct measurements and in estimating the age of children without birth certificates.

This is a descriptive, analytical and longitudinal survey of the nutritional status of children in public elementary school in the Atlantic department. The study involved 600 elementary school children benefiting from the State's National School Canteen Program. The study was extended over one school year (2022-2023), during which the nutritional status of the children was closely monitored. During the 2022-2023 school year, weight, height, age, sex, brachial perimeter and cranial perimeter of the schoolchildren was measured. These values were taken three times during the school year, on the same selected pupils: In September, March and May. The study was carried out in a number of randomly selected schools in the Atlantic department.

Data were collected on weekdays during the 10:15 a.m. or 4:15 p.m. recess.

The variables analyzed were quantitative. They include body weight, height, head circumference and gill circumference, measured before and after the resumption of school meals in the various schools visited by 600 pupils.

The data collected for each parameter were averaged and compared with each other. The t-test (or non-parametric test) was used to compare means. GraphPad Prism 9.5.1 (733) was used to produce the histograms.

RESULTS

Table 1 presents the results of the statistical analysis during the first school year. Results of the statistical analysis showed that the weight, height, median cranial and branchial perimeters of schoolchildren increased significantly after the resumption of school canteens ($p < 0.05$).

The average weight of school children increased significantly between the 1st and 2nd intake ($p < 0.05$). But this weight did not vary significantly between the 2nd and 3rd intake ($p = 0.2646$) (Fig. 1). The average height of the students did not vary significantly between the 1st and 3rd intake ($p > 0.05$) (Fig. 2). According to Fig. 3, average head circumference of pupils increased significantly between the 1st and 2nd intakes ($p < 0.05$). But it did not vary significantly between the 2nd and 3rd intake ($p = 0.1266$). According to Fig. 4, the average gill perimeter of school children increased significantly between the 1st and 2nd feedings ($p < 0.05$). But it did not vary significantly between the 2nd and 3rd feedings ($p = 0.1426$).

DISCUSSION

First, school canteens relieve parents of their workload, allowing them to devote more time to their own activities. Secondly, parents save money by feeding their children at canteens. But there are other advantages too: with the help of the school canteen, children eat well-balanced meals and this helps their parents manage them better during the day and improve their performance. In some canteens where food is

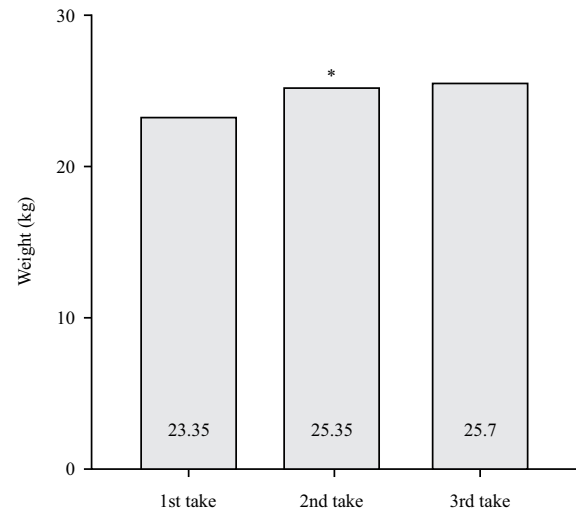


Fig. 1: Weight trends over the 1st school year

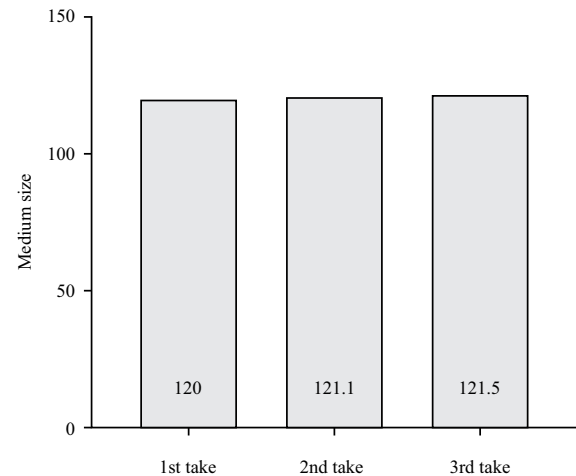


Fig. 2: Height trends over the 1st school year

Table 1: Results of the statistical analysis of data taken during the first school year

Parameters	Before canteens	After canteens	p-value
Median weight	23±5.5	25±5.5	<2.2e-16
Median height	120±10.9	121±10.8	<2.2e-16
Median head circumference	52±2.9	53±2.9	<2.2e-16
Median gill perimeter	18±2.0	19±6.8	<2.2e-16*

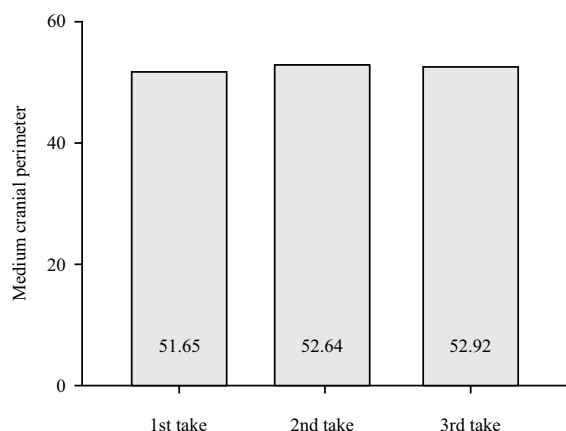


Fig. 3: Evolution of head circumferences of school children during the 1st year

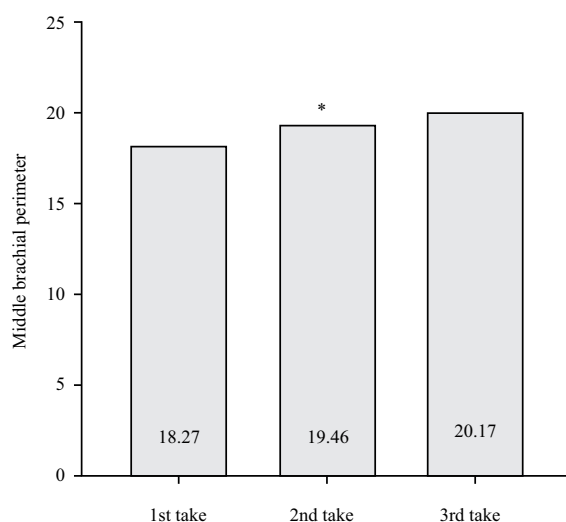


Fig. 4: Evolution of brachial perimeters during the 1st school year

provided, the canteen enables some parents to save on food. School heads commented positively on the impact of the school canteens on student enrolment, retention, attendance, performance and academic achievement, while parents highlighted the reduced risk of dropping out of school, the child's motivation to attend school/class and the child's performance⁷.

Overall, the proportion of favorable opinions about school canteens ranged from 88-97% for boys and 90-97% for girls⁸. More specifically, opinions remained slightly different between boys and girls on certain aspects. (In terms of attendance rates, most units surveyed believed that the school canteen improved girls' attendance rates (92%) more than

boys' (88%)⁹. The canteens increased and maintained the number of children in schools, especially when providers start their activities, in this case for those who were traveling a long distance.

Almost all the parents surveyed believed that the school canteen has had an impact on their children's motivation to attend school and class and consequently on their performance. For example, according to all parents surveyed, the school canteen has reduced the risk of children dropping out of school, especially girls (97%), although the difference with boys (95%) remained small and was not statistically significant.

Children's physical and mental well-being and thus their learning, is improved by school canteens¹⁰. In fact, the provision of food in schools acts on two levels: On the one hand, pupils' nutrition and health are improved, on the other, canteens play an important role in keeping students in the classroom, especially young girls. Therefore, canteens play a significant role in improving academic performance and reducing dropout rates¹¹. School canteens offer numerous advantages and there is increased discussion about how to source the agricultural produce that will feed them formally and clearly.

CONCLUSION

Education has always been recognized as one of the means of achieving a nation's growth and development objectives. Unfortunately, Children in Benin who attend school are not all well nourished and this is a major obstacle that must be addressed. In the search for adequate solutions to these problems, school feeding, through canteens, has been identified as one of the main measures capable of promoting access, keeping learners in school and helping to improve their performance, particularly in rural areas. In view of the results of this study, it is clear that better management of school feeding requires a number of pillars: The political and legal framework, financial capacity, institutional capacity, the design and implementation of good programs and the role of communities. Linking school food with local production and local producers is not automatic. Purchasing local food takes time and needs to be phased in gradually, according to the specific context of each country and the capacity of stakeholders to adapt and manage the risks involved in implementing this strategy. Today, there are no real territorial policies or laws on territorial food systems that define the prerogatives of each player. School food strategies need to be clearly defined to provide a clear vision of what is expected of

the school food system, the global food system and what is or should be the role of local authorities and stakeholders. Without a real strategy, communities won't be able to fully understand and play their role.

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