

## Improving the nutrient content of the lunch boxes of children in Early Childhood Development Centers in Nelson Mandela Bay, South Africa through parent programs: Baseline nutrition survey results

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### ABSTRACT

**Background:** Earlier research from Early Childhood Development (ECD) Centers in Nelson Mandela Bay showed a double burden of both chronic underweight and overweight in the same vulnerable communities. Lunch boxes that parents pack for children attending ECD centers have been noted to fall short of the recommended dietary standards. Despite this, no similar research has been done with the parents concerning the content of the lunchboxes and if nutrition education strategies can improve the lunchbox content. The primary aim of the study is to improve the nutrient content of the lunchboxes of the preschool children through parent programs. It is hoped that this will help increase access to healthy lunch boxes among preschool children in Nelson Mandela Bay.

**Methods:** Ethical approval for this study was obtained from Nelson Mandela University. During February 2018, 485 participants from preschools in underprivileged areas were weighed and measured by trained fieldworkers to determine the weight-for-age Z-score, height-for-age Z-score and weight-for-height Z-score using the WHO Anthro.

**Results:** The baseline nutrition survey results from 381 participants (age range 5–60 months) showed that 2.4% ( $n = 9$ ) of the participants were wasted, 14.5% ( $n = 55$ ) stunted, 3.7% severely stunted ( $n = 14$ ) and 14.9% ( $n = 57$ ) underweight. The most wasted age group of the children was between 36 and 47 months 5.2% ( $n = 6$ ) while the most severely stunted age group was between 6 and 11 months 12.5% ( $n = 8$ ). Similarly, the same age group (6–11 months) registered the highest underweight percentage 12.5% ( $n = 8$ ). On the other hand, 37.2% ( $n = 141$ ) of the children were overweight. The overweight children were between 12 and 23 months of age. Findings indicate a double burden of disease in the form of stunting and overweight present in the same geographical populations.

**Conclusions:** This implies that any nutrition intervention should be targeted to the needs of specific individuals. In addition, urgent preventative strategies are needed to investigate the causes of this double burden and the potential contribution that parents can make to prevent this.

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### Introduction

Children establish their dietary behavior during childhood [1]. During this stage, 55% of all children are in early childhood development (ECD) centers. Furthermore, most preschool children globally spend approximately 25 hours every week in the ECD centers where they consume a large portion of their daily diets [2]. During the preschool

years, parents retain the main responsibility of developing the preferences of foods for their children based on food availability, accessibility, modeling, and exposure. Additionally, several barriers hinder healthy eating habits among the preschool children [3]. Some of the common barriers include the higher costs of healthy foods, preparation time, cultural issues, and insufficient knowledge about

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healthy foods [4]. Most studies done on the lunch boxes and the meals provided in the ECD centers highlight insufficient provision of the daily energy requirements as well as a shortage of several essential nutrients [5]. Poor eating habits within school environments and poor dietary habits are common among South African rural settings [6]. This has largely contributed to high stunting rates in South Africa (SA) with the trend high above most countries at similar levels of economic growth. This occurs despite the significant improvement in the prevalence of wasting because of policy nutrition programs since the end of apartheid. Emerging obesity has also been observed in the Eastern Cape (EC) and Nelson Mandela Bay (NMB) with up to 20% overweight among children below 5 years of age [7]. No similar research has been done in NMB to determine the knowledge and practices of caregivers preparing lunch boxes for children and if education strategies can improve these practices. A timely nutrition program involving the parents may prevent further malnutrition and result in the proper growth and development of the children. The primary aim of this action study is to change knowledge, attitudes, and practices of parents to increase access to healthy lunch boxes among pre-school children in NMB for improved growth and development.

## Materials and Methods

Ethical approval for the study was obtained from Nelson Mandela University. During February 2018, 485 participants from ECD centers in underprivileged areas were weighed and measured by trained fieldworkers to determine their nutritional status using the WHO child growth standard cut-offs. The ECD centers were purposively selected which allowed for the researcher's application of specific knowledge of the study population while the participants conveniently sampled. The inclusion criteria for the participants were children between 5 and 60 months at the time of data collection and who were provided with lunch boxes in the selected pre-schools. Before conducting the study, the researcher described the research aim to the practitioners and parents and obtained written informed consent from the parents of the children involved. While 485 children were measured for anthropometric assessment, the result in this study is given for 381 children highlighting 104 missing cases that resulted from the data cleaning process. Particularly, incomplete clinical records of children where

some of the childrens' registers did not include their age. The main materials used for the survey were weighing scales, children mid-upper arm circumference (MUAC) tapes, height boards, clinic cards, and road to health booklets for plotting and interpreting Z-scores. The weighing scales were used for weight measurements, MUAC tapes for determining the mid-upper arm circumference, height boards for taking height measurements, and clinic cards for recording the age of children. In addition, the road to health booklet was used to calculate the nutritional status of the children using the WHO child growth standard cut-offs. The WHO Z-score indicators are internationally used for assessing nutritional imbalance in the form of undernutrition (stunting, wasting, and underweight) and overnutrition (overweight and obesity) in children [8]. The WHO child growth standard cut-offs for malnutrition markers are shown in Table 1.

## Results and Discussions

The baseline nutrition survey results from 381 participants (age range 5–60 months) showed that 2.4% ( $n = 9$ ) of the participants were wasted, 14.5% ( $n = 55$ ) stunted, 3.7% severely stunted ( $n = 14$ ), and 14.9% ( $n = 57$ ) underweight. The most wasted age group of the children was between 36 and 47 months, 5.2% ( $n = 6$ ), while the most severely stunted age group was between 6 and 11 months, 12.5% ( $n = 8$ ). Similarly, the same age group (6–11 months) registered the highest underweight percentage of 12.5% ( $n = 8$ ). On the other hand, 37.2% ( $n = 141$ ) of the children were overweight according to their body mass index for age. The overweight children were between 12 and 23 months of age. Findings indicate a double burden of disease was present with chronic undernutrition in the form of stunting and overweight present in the same geographical populations. Addressing the present malnutrition requires interventions targeted to the needs of specific individuals and not blanket supplementation programs often targeted to impact underweight. This is because blanket

**Table 1.** WHO anthropometric reference.

Malnutrition markers assessed	WHO child growth standard cut offs
Stunting	Height for age $< -2$ standard deviations (SD)
Underweight	Weight for age $< -2$ SD
Wasting	Weight for height $< -2$ SD
Overweight	Weight for height $> +2$ SD

supplementations may result in further weight gain in the already overweight population. Successful parent programs may play a pivotal role in improving dietary diversity in children from underprivileged communities thus providing an opportunity for improved growth and development. The contents of intervention programs should be developed through participatory approaches to ensure adequate buy-in from the caregivers. Addressing the childhood malnutrition problem may require aligning and coordinating various interventions by stakeholders in early nutrition such as non-communicable disease control, managing infectious diseases as well as over nutrition and undernutrition management. The study findings relate to the survey by Kimani-Murage [8] highlighting stunting rates in the rural areas of the EC SA at 15%. Furthermore, a survey by the National Food Consumption Survey (NFCS) of SA that sampled 1,512 children below 60 months of age presented a 20.1% stunting rates, 6.8% underweight, and 20.6% overweight [9]. The differences in the above results to the findings in the present study may be attributed to sociodemographic and economic differences such as level of education of the parents, income, employment status of parents, and food security situation. Nonetheless, the sample size of the NFCS was larger than the present study, hence improving the reliability of its findings. Another study conducted in the Free State, Limpopo, EC, and North West highlights that stunting prevalence in SA is on the rise over the last 2 decades with current approximations at 20% [10]. The above provinces also have high poverty levels, informal settlements, poor sanitation access, and unemployment potentially contributing to the malnutrition prevalence. All the aforementioned studies highlighted point to child malnutrition problem that when not addressed will increase the public health burden in terms of infant morbidity, mortality, as well as increasing health-care costs [11].

## Summary and Conclusions

This study demonstrated that stunting, wasting, and overweight were present in the same population of preschool children in Nelson Mandel Bay. The study also revealed a double burden of disease in the form of undernutrition and overnutrition present in the study population. The above has been associated with a number of factors including parental level of education, poverty, and unemployment. The study highlights the need for urgent preventative measures such as parent programs with interventions

addressed towards the specific nutritional needs of children, thus providing an opportunity for improved growth and development.

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