

White Paper:

Establishing breakfast habits to fight childhood malnutrition in South
Africa: opportunities and challenges

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1 Introduction

Historically, the success of companies was defined solely by their ability to expand their market shares. As the world population continues to increase and resources dwindle, modern business principles are shifting towards the idea of creating shared value (CSV) which seeks to establish win-win relationships that simultaneously benefit and sustain the company, society and the environment.^{1,2} Accordingly, one of three primary goals of Unilever's *Sustainable Living Plan*, is to 'help people take action to improve their health and well-being', not just by providing quality food products that are both nutritious and appealing, but also by promoting healthy nutrition habits amongst consumers.³ A large body of evidence supports the regular consumption of breakfast as one of the key nutritional habits associated with good health.

This white paper seeks to scientifically clarify the value of habitually eating breakfast, in relation to the growth and development of children in South Africa. Nutrition issues affecting 2 to 12 year old children, the wide-reaching consequences of malnutrition in this vulnerable group, the scope of the problem in South Africa, and the current national strategies for tackling malnutrition, are summarised, and opportunities for the food industry to contribute to these strategies, are identified. In addition, the paper explores the scientific evidence that defines a healthy breakfast for children, the role of behaviour change in getting children to make breakfast a habit, and the opportunity for tackling malnutrition in driving behaviour change around breakfast. Finally, the paper highlights the role of products that are innovated to have a good nutrition profile, as part of a healthy breakfast.

2 Nutrition issues affecting 2 to 12 year old children in South Africa

Over the course of the 20th century, the world has undergone a profound health transition, with non-communicable diseases (NCDs), including obesity, cardiovascular diseases, cancers, diabetes, chronic respiratory disorders and mental illness, replacing infectious diseases and nutritional deficiency disorders as the leading causes of disability and death.⁴ This evolutionary process, driven by rapid demographic, economic, nutritional, sociocultural and ecological changes, started in higher-income countries and spread with increasing velocity over the last 50 years to low and middle-income countries.⁴ In developing regions, including sub-Saharan Africa, the prevalence of overweight and obesity and the accompanying NCDs have been rapidly escalating,⁵ even as high levels of infectious diseases and malnutrition that endanger the health of mothers and children, remain unresolved.⁴

Many studies, including four nationally representative surveys over the last 20 years, attest to this 'double burden of disease' also occurring amongst South African children. These were the 1994 South African Vitamin A Consultative Group (SAVACG) Survey⁶, the 1999 National Food consumption Survey (NFCS-1999)⁷, the 2005 National Food Consumption Survey Fortification Baseline (NFCS-FB-I₂₀₀₅)⁸, and the South African National Health and Nutrition Survey (SANHANES₂₀₁₂).⁹ Similar to other developing regions of the world, different forms of malnutrition, including underweight, wasting, stunting, and overweight and obesity, as well as micronutrient deficiencies, were found to co-exist in the same communities, within the same households, and even within the same children in South Africa.

2.1 Underweight and wasting

Underweight refers to children who are too thin; thus, their weight-for-age falls below that of the normal reference population, as a result of acute significant food shortage and/or disease.¹⁰ In a more advanced cases, extreme thinness is defined as wasting when children's weight in relation to their height (weight for height) falls below normal reference values. According to the 2008 Lancet Series on Maternal and Child Undernutrition, severe acute malnutrition (SAM) is a strong predictor of death among children under the age of five, particularly in developing countries.¹¹

SANHANES₂₀₁₂, which was the most recent nationally representative survey conducted in the country, found that 6.9% of South African children were underweight, and 3.7% were wasted.⁹

2.2 Stunting

Stunting refers to children who are too short (small) for their age, but not necessarily thin; therefore their height for age falls below that of the normal reference population. This type of malnutrition is caused by chronic lack of nutritious food that persists over a longer period of time, or by chronic infection leading to malabsorption of nutrients.¹⁰ Many children in developing countries have diets that consist almost entirely of starchy staple foods, like maize and bread, with few vegetables and little protein. They may eat enough energy, but they miss out on a varied diet that would give them enough protein and the essential vitamins and minerals that they need to grow.

Subsequent growth disruption has detrimental effects on their cognitive development, which may be defined as a complex set of higher mental functions that include attention, memory, thinking, learning, and perception.^{12,13} Therefore stunting has profound long-term implications for children's education, beyond the fact that malnourished children have less energy and interest for learning.¹³ Research has linked better cognition to more successful schooling and eventual adult productivity,¹³ whilst more education, in turn, has been linked in many studies, to better personal health,¹⁴ through health determinants which include better jobs, higher income, higher socio-economic status, better health care access and housing, as well as better lifestyle, nutrition, and physical activity.¹⁵ Education increases an individual's sense of personal control and self-esteem; which have also been shown to influence better health behaviour.¹³ Academic achievement is important for future personal health, and is therefore a significant public health concern.¹³

Mothers who are stunted may give birth to babies whose growth in the womb is restricted, illustrating an intergenerational effect of stunting.¹⁰ In turn, infants who are born small-for-age due to intra-uterine growth restriction, are at increased risk for complications before, during and shortly after birth.¹⁶ Moreover, children who are deprived of adequate nutrition in the first 1000 days of life, from conception up to about two years of age, undergo metabolic adaptations which put them at lifelong increased risk for overweight and obesity¹⁷ and NCDs.¹²

According to SANHANES₂₀₁₂, 19.2% (1 in 5) of South African children were stunted. The highest prevalence (around 1 in 4) occurred in the 0-3 years age group, which is also the only age group in which no improvement was found since the NFCS-FB-I₂₀₀₅.^{8,9}

2.3 Overweight and obesity

Overweight and obesity represents another form of malnutrition in which children's weight in relation to their height, increases above that of the normal reference population. This may also be expressed as above normal body mass index (BMI, kg/m²) for age.¹²

The major cause of overweight and obesity is considered to be the global switch to more energy-dense diets associated with high intakes of fatty foods, refined carbohydrates and sugary beverages. Other contributing factors include genetics, intra-uterine and early life malnutrition, increasingly sedentary lifestyles, distorted perceptions of appropriate portion sizes, low levels of education, as well as cultural and environmental factors, and stress.^{18,19} Interestingly, in most countries there are only small differences in the prevalence of childhood overweight between the richest and poorest populations.¹²

Childhood obesity may have profound immediate negative effects on the social, and emotional well-being, and self-esteem of children, and are associated with poor academic performance and a lower quality of life experienced by the child.¹⁸ Obese children often develop skeletal, nerve, lung, liver or

kidney disorders. In addition, they may suffer from insulin resistance, hypertension and increased levels of blood glucose, cholesterol and triglycerides, all of which track into adulthood and increase the risk for adult onset diabetes, cardiovascular diseases, some types of cancers, and other NCDs later in life.¹⁸ Animal studies also suggest that there may be a biological link between obesity and impaired cognitive performance that is related to insulin resistance and altered glucose metabolism.¹³ The younger the onset of obesity, particularly if it happens before the age of six, the greater the risk for lifelong obesity and associated NCDs.²⁰ In addition, other characteristics of westernised eating patterns, including increased intakes of salt (sodium) and decreased intakes of protective vegetables, fruits and fibre, also contribute to the risk of NCDs.²¹

SANHANES₂₀₁₂ found that, based on BMI among children 2 to 14 years, 23.6% of girls (16.5% overweight and 7.1% obese) and 16.2% of boys (11.5% overweight and 4.7% obese) were at risk for NCDs.⁹ Overweight and obesity prevalence was highest in the 2 to 5 year age group, which constitutes a 50% increase over a period of 7 years, from 15.1% in the NFCS-FB-I₂₀₀₅⁸, to 22.9% in SANHANES₂₀₁₂⁹ (for overweight and obesity combined, in the genders combined).

2.4 Micronutrient deficiencies

Malnutrition resulting from diets that are deficient in essential vitamins and minerals, is often called 'hidden hunger', as the consequences are not always immediately visible.^{10,22} Globally, the most prevalent micronutrient deficiencies remain vitamin A, iron, zinc and iodine deficiencies, which all directly, and often irreversibly⁹ impact on growth and development.²² Pregnant women, their unborn offspring, and young children, particularly before the age of five, are the most vulnerable to these micronutrient deficiencies and, consequently, suffer the greatest adverse effects.¹²

- *Vitamin A*

Vitamin A deficiency remains the most important cause of visual impairment and blindness amongst children.⁹ In addition, subclinical deficiencies in pregnant women are associated with foetal growth retardation and increased mortality.¹² In children, subclinical vitamin A deficiency impairs growth and immunity and increases the risk of the child dying from infectious diseases.^{12,22} According to SANHANES₂₀₁₂, 43.6% of South African children under 5 years suffered from vitamin A deficiency.⁹ This constitutes a 30% decrease in 7 years, from 63.6% in NFCS-FB-I₂₀₀₅,⁸ and indicates that current national nutrition intervention to eradicate vitamin A deficiency in this age group, may be at least partially successful. The prevalence in 2012 was still higher than 20% in all nine provinces, though, and therefore vitamin A deficiency remains a severe problem of public health significance, according to the WHO classifications.⁹

- *Iron*

Iron deficiency anaemia in children, particularly if it occurs under the age of 5 years, is associated with increased childhood morbidity, impaired cognitive development and poor future school performance.¹² In the under 5 year olds, SANHANES₂₀₁₂ found that the prevalence of iron depletion was 8.1% and of iron deficiency anaemia, 1.9%, which, compared to NFCS-FB-I₂₀₀₅, constitutes decreases of 63% and 83.2%, respectively. This is largely due to a combination of national public health interventions discussed later. Yet, SANHANES₂₀₁₂ found that 11% of South-African children had depleted iron stores, whilst 2.1% suffered from iron deficiency anaemia, which means that 1 in 8 still had inadequate iron levels.

- *Zinc*

Zinc deficiency has been strongly linked with impairment of growth and immunity.¹² Nationally, 45.3% of children (1–9 years) had an inadequate zinc status in NFCS-FB-I₂₀₀₅. Data on zinc status was not reported in SANHANES₂₀₁₂.

- *Iodine*

Severe iodine deficiency in pregnancy causes cretinism, associated with mental retardation, whilst subclinical deficiencies impact negatively on mental development.¹² NFCS-FB-I₂₀₀₅, however, found that South Africa had achieved the virtual elimination of iodine deficiency disorders, which is attributed to mandatory table salt iodisation introduced in December 1995.⁸

- *Other micronutrients*

NFCS-1999⁷ also found that South African children also have inadequate intakes of vitamins D, C and E, some B-vitamins (riboflavin, niacin, vitamin B6 and folic acid), calcium, and selenium. Adequate intakes of vitamin D and calcium are vital to support normal growth and physical development, and to reduce future risk for NCDs¹⁹, whilst deficiencies in folate and vitamin B₁₂ have also been linked to impaired neurological and cognitive development in children.¹³

2.5 Inadequate omega-3 fatty acid intake

In recent years, there has been growing interest in the effect of essential fatty acids, particularly long chain polyunsaturated fatty acids, on cognitive brain development.^{13,23} Most brain development occurs in children before the age of 5 years. Of the human brain's dry weight, 60% is comprised of lipids, of which 20% are docosahexaenoic acid (DHA; which is an omega-3 fatty acid) and arachidonic acid (AA; an omega-6 fatty acid). These represent the two core fatty acids found in grey matter.¹³ Two South African studies have shown a positive effect from DHA and eicosapentaenoic acid (EPA, which is converted to DHA in the body) on the learning and memory of school-aged children.²⁴

The supply of long chain polyunsaturated fatty acids from food, especially the omega-3 fatty acids, including DHA, EPA and alpha-linolenic acid (ALA, which is converted to EPA and DHA in the body) is known to be inadequate in modern diets.^{13,23,25–28} In addition, a growing body of evidence links inadequate intakes of omega-3 fatty acids to an increased risk for obesity and NCDs.^{26–28} No national representative data has been collected for this fatty acid, but there is evidence that the intakes among South African children falls below nationally adopted guidelines.²⁹

2.6 In summary

From the above discussion, it is evident that the various types of malnutrition are highly interrelated. Furthermore, they often overlap; for example, a young child that is stunted may also suffer from micronutrient deficiencies and be underweight, but is more likely to become overweight later on in childhood, adolescence or adult life¹⁷; another may be primarily obese and may or may not have micronutrient deficiencies. This poses significant challenges for public health and nutrition interventions that aim to prevent and alleviate malnutrition in all its manifestations, amongst South African children, from all walks of life.

3 Current national strategies for tackling malnutrition

After the first democratic election in South Africa in 1994, policies were adopted to unify and decentralise the national health system. This included the Integrated Nutrition Programme (INP) which adopted the United Nations Children's Fund (UNICEF)'s Conceptual Framework on

Malnutrition³⁰, and targets nutritionally vulnerable and at-risk communities, groups and individuals for nutrition interventions.³¹

3.1 Integrated Nutrition Programme: Feeding, supplementation and fortification

Two of the three main components of the INP, are community-based nutrition programmes, and nutrition promotion.³¹ Programmes under the INP, which specifically aim to address malnutrition amongst children 2 to 12 years, include the following:

- *National School Nutrition Programme*

The Primary School Nutrition Programme (PSNP) was implemented in 1994 to improve the health and education of primary school learners by aiming to alleviating hunger, to enhance active learning capacity and improving school attendance and punctuality, as well as to address micronutrient deficiencies and improve nutrition knowledge and practices.

An evaluation of the PSNP by the Health Systems Trust (published in 1997),³² found that the education, health and nutrition goals of the PSNP had not been realised and coverage had been poor in many parts of the country. Many of the problems of the PSNP had been the result of inadequate management of the programme due to a lack of capacity, inefficient and inappropriate management systems, poor infrastructure in rural areas of the country, and corruption. Due to these factors, the programme was transferred from the INP to the Department of Education in 2004 and the name changed to the National School Nutrition Programme (NSNP).

The NSNP aims to provide all children in poorer primary and secondary schools (quintile 1, 2 and 3 schools) with one nutritious meal per school day, which should consist of a protein (including soya, fish, eggs, milk, beans or lentils), carbohydrate or starch (rice, bread or maize), fats, oils and salt (added for taste) and a fruit or vegetable (should be served daily where possible), with different food types from these groups to be provided alternately. The meal should be served to the learners by 10:00 am, and where breakfast is served at school before periods start, the main meal may be served later in the day. Learners are free to choose whether they want to eat the meal or not. Schools are also supported to grow their own vegetable gardens, and to teach basic nutrition and food hygiene principles.³³

For the first 10 years the NSNP was coordinated by the Department of Health as a shared component between health and education as it was centred around understanding how health and nutritional factors affected a child's performance at school. In 2002 the National Cabinet decided to transfer the programme to the Department of Education with effect from April 2004.

Many of the problems experienced with the PSNP, are still plaguing the NSNP, including problems with coverage, as well as fraud and corruption that directly translates to the prescribed food often not reaching the targeted children.³⁴

- *National vitamin A supplementation (VAS) programme*

Based on the findings of the SAVACG survey, South Africa implemented a blanket VAS programme nationally in 2002 among children 6 months to five years of age and among females post-partum.³⁵

- *National food fortification programme*

In addition, mandatory fortification of all maize and wheat bread flour (which are the primary staples for the majority of South Africans) with iron, zinc, vitamin A, and a variety of B-vitamins (thiamin, riboflavin, vitamin B6 and folic acid), was enacted in 2003.³⁶

- *Iodisation of salt*

Mandatory table salt iodisation was introduced in December 1995.³⁷

3.2 Growth monitoring

In order to prevent underweight, wasting and stunting, as well as identify and manage malnutrition amongst young children, the INP also aims to establish and strengthen sustainable growth monitoring practices, firstly at health facilities and, secondly, in communities.³¹

3.3 South African Food Based Dietary Guidelines

The South African food-based dietary guidelines (FBDGs) are a set of brief, positive dietary recommendation messages that were scientifically developed and validated specifically for the diverse South African population. These guidelines, which are regularly revised and updated, were adopted by the Department of Health and are used to inform consumers how to choose food and beverage combinations that will lead to a diet that is adequate, that meets nutrient need and that is, at the same time, prudent, for example, which lowers the risk of NCDs.³⁸

3.4 Success of the INP to eradicate childhood malnutrition in South Africa

While NFCS-FB-I₂₀₀₅ had already established that the blanket iodization of salt since 1995, was successful to effectively eradicate iodine deficiency disorders in South Africa, the rest of the INP programmes aimed at addressing malnutrition amongst children in South Africa, have not eradicated stunting and vitamin A and iron deficiencies among children, as evidenced by SANHANES₂₀₁₂. From the SANHANES-data it appeared that INP-activities targeted at school-going children, has been more effective than those targeting children under 5 years.³⁹ The Strategic Plan for Maternal, Newborn, Child and Women's Health (MNCWH) and Nutrition in South Africa: 2012–2016, was therefore developed to step up healthcare efforts to prevent and address malnutrition in this age group. A recent study carried out among children from four far-apart districts in South Africa, still found significant levels of vitamin A deficiency and stunting,⁴⁰ indicating that the battle against undernutrition and micronutrient deficiencies is not yet won. In addition, much still needs to be done to address the rising rates of overweight and obesity amongst the South African youth.

3.5 Gaps and opportunities

The causes of malnutrition are multiple, complex and varied;³⁰ therefore interventions need to be implemented on many different levels. Whilst government has the obligation to combat malnutrition, the private sector has substantial potential to contribute to acceleration of improvements in nutrition.¹¹ A need remains for innovative food products with good nutritional profiles to bridge the nutrition gaps that still exists.

This alone may not be enough, as it is increasingly becoming apparent that people should be actively involved in the solutions to their own health problems by adopting healthy lifestyle and preferably instilling these in children from a young age. Empirical evidence supports breakfast as a habit that is consistently associated with good health.

4 The importance of breakfast for children

Breakfast is widely acknowledged as the most important meal of the day, particularly in the context of childhood health and wellness. This is evident from the large body of literature briefly summarised below.^{41,42,43}

4.1 Effect of breakfast on diet quality

Children who regularly consume breakfast, generally have better overall dietary quality;⁴¹ and they tend to make better food choices throughout the day, eat more vegetables, fruit and milk and have fewer soft drinks,⁴³ whereas those who regularly skip breakfast, tend to snack more⁴⁴ and choose high-fat snacks.^{41,43} Adolescents who skip breakfast, tend to omit other meals too,⁴⁴ which may directly result in or worsen inadequate intakes. In accordance, learners who habitually eat breakfast, have greater intake of fibre, calcium, vitamin D, vitamin C, B vitamins (folate, thiamine, riboflavin, niacin, vitaminB₆, and vitaminB₁₂), iron and lower intake of fat, cholesterol, and sodium, than breakfast skippers.^{41,42,43} In addition, the improvement in dietary quality among learners with access to the school breakfast programmes, may even extend to their family members.⁴⁵ Conversely, breakfast skippers are more likely to have overall diets defined as poor or inadequate.⁴¹

4.2 Role of breakfast in weight management and reducing the risk for NCDs

Two systematic reviews of studies including more than 60 000 children, concluded that children and adolescents who habitually consume breakfast, have a reduced likelihood of being overweight.^{46,47} Consuming breakfast can also contribute to maintaining BMI within the normal range.⁴⁹ Breakfast-eaters also have lower waist circumference, which is an indicator of central obesity and a predictor of the risk of NCDs.⁴³ Various studies have shown an association between a regular breakfast consumption of oat-, barley-, or psyllium-based cereals and reduced risk of elevated cholesterol and triglyceride levels, hypertension and cardiovascular disease.⁴⁸ Children who did not eat breakfast daily, were found to have poorer blood glucose control, more insulin resistance and a higher risk for type 2 diabetes, than those who did not, even after adjusting for differences in BMI, socio-economic status and physical activity levels.⁵⁰ Regular intakes of whole-grain or high-fibre cereals at breakfast appeared to be particularly protective against diabetes-related risk factors.^{48,50} Evidence also suggest that taking a complete and well-balanced breakfast avoids hunger feelings in the morning which can lead to nibbling snack foods, particularly those high in sugar and/or fat.⁵¹

4.3 Relation of breakfast to other healthy lifestyle factors

Habitual breakfast consumption has also been consistently associated with other healthy lifestyles. Children and adolescents who do not consume breakfast, are more likely to be less physically active and have a lower cardiorespiratory fitness level.^{41,49} They are also more likely to participate in smoking, alcohol use, disordered eating, and unhealthy weight management practices.^{43,44} Thus, breakfast consumption may be a marker of an overall healthy lifestyle.

4.4 Effects of breakfast on general health and well-being

Learners experiencing hunger, are more likely to complain of more frequent stomach aches and headaches.⁴³ Conversely, studies find that learners with access to free school breakfast programmes, make fewer visits to the school nurse.⁵² Participation in school breakfast programmes is further associated with less anxiety, and depression among learners⁴³, and greater feelings of contentment.⁴¹

4.5 Effects of breakfast on cognitive functioning and academic performance

The rate of glucose metabolism in children's brains increases from birth until 4 years of age, reaching twice that of the adults' metabolic rate, and remains elevated until 9–10 years of age, before it declines to the adult level by late adolescence.¹³ Regular meals to ensure a continuous glucose supply to the brain are therefore more important in children than in adults. Accordingly, children are more

prone to the adverse effect of overnight fasting, making breakfast a very important meal to provide fuel for the brain in the morning.¹³

Although the evidence is quite mixed, studies generally demonstrate that eating breakfast has a positive effect on children's behaviour and cognitive performance, particularly with regard to memory and attention, which is most demonstrable in undernourished children with below normal height or weight for age.^{13,42,43}

Children who are food insecure and/or undernourished, were found to have poorer cognitive functioning when they miss breakfast,⁵³ have a high prevalence of behavioural, emotional, and academic problems, and are more likely to repeat a grade.⁴³ Conversely, learners who participate in school breakfast programmes showed improved school attendance⁵⁴, more punctuality,⁴³ less tardiness,⁴² less disruptive behaviour in class⁴², and less hyperactivity (as rated by their teachers), whilst they were more engaged in class learning activities.^{42,55}

Two systematic reviews found that regular breakfast consumption has an immediate (acute) positive effect on cognitive performance,^{42,55} with regard to alertness, attention, memory, problem-solving, and arithmetic,⁵⁴ particularly among undernourished children.⁴² School-based breakfast experiments with children 6 to 8 years and 9 to 11 years, found that eating breakfast increases spatial memory, and improves processing of complex visual stimuli,⁵⁶ Some studies, however, found that regardless of their socio-economic and nutritional status, learners who regularly eat breakfast, had better on-task classroom behaviour.⁴² Interestingly, evidence also suggests that, with regard to on-task behaviour in the classroom, a mid-morning snack is only beneficial for children who have skipped or eaten very little for breakfast.⁴²

4.6 In summary

The habit of eating breakfast on a regular basis seems to have far-reaching benefits for children. The exact mechanisms by which breakfast impacts positively on health, behaviour and academic performance, appears to be a combination of improved acute energy and nutrient availability for on-task performance, as well as long-term effects on growth and cognitive development. In addition, breakfast eating seem to cluster with other healthy lifestyle choices.

Regardless of the mechanisms involved, breakfast seems a worthwhile habit to establish amongst South African children, as it has the potential to simultaneously address underweight, wasting and stunting, micronutrient deficiencies, as well as overweight and obesity and the associated risks for NCDs.

5 The breakfast habits of South African children

In a literature search spanning from 1980 to 2016 on Science Direct, Pubmed, Ebscohost databases, as well as utilisation Google Scholar as a search engine, yielded very few studies^{9,57-58} addressing breakfast intake amongst South African children and adolescents.

5.1 Frequency of breakfast consumption

The only national representative data on breakfast habits among South African children, was collected in SANHANES₂₀₁₂.⁹ amongst 10-14 year olds. Overall, 1 in 5 children (19%), indicated that they did not eat breakfast before school, which is in line with all the other localised studies.⁵⁷⁻⁵⁸ The majority of children in SANHANES₂₀₁₂ believed it was important to have breakfast because it helped them concentrate better at school (86.1%) and because it helped to give them energy for the day (89.3%).⁹

Data from the longitudinal cohort living in Soweto and Johannesburg, found that breakfast eating decreased as the children grew older⁵⁹, which is in line with international findings.⁴¹

5.2 Reasons given for not eating breakfast at home

A third (33.9%) of children gave the reason for skipping breakfast as not having enough food in the house, which indicates a food security issue. This concurs with the high levels of food insecurity in the country⁹, as well as findings among adolescents in Cape Town schools that those from lower socio-economic backgrounds were more likely to skip breakfast.⁶⁰

Most children in SANHANES₂₀₁₂ (39.2%) said they were not hungry early in the morning, and 19.2% said that they cannot get up early enough to have breakfast at home. The rest indicated that they did not eat breakfast because people at home were not having breakfast (33%), or that they cannot make their own breakfast (15.3%).⁹ These answers indicate environmental and behaviour issues and highlight the opportunity that parents and caregivers have to influence breakfast consumption by ensuring the availability of food and being role models.

5.3 Foods eaten for breakfast

The literature search did not yield any published data specifically related to what South Africa children 2 to 12 years are eating for breakfast. Only one study, conducted in the in the Northwest Province⁵⁸, assessed breakfast quality in adolescents in grades 9-11 (which would include learners of mostly 14 year and older). This may not necessarily represent the breakfast habits of all South African adolescents and that of younger children in South Africa, but may serve as an indication.

The overall quality of the breakfast consumed in this study was classified as moderate.⁵⁸ The most frequently consumed foods at breakfast were bread, milk, ready-to-eat cereals (RTEC) and maize porridge.⁵⁸ Added sugar was consumed by 55% of the adolescents at breakfast, and was consumed in an average serving size of 19 g (4 teaspoons).⁵⁸ Margarine was consumed by 17% of the adolescents at breakfast in an average serving size of 14 g (3 teaspoons).⁵⁸ The beverages most frequently consumed at breakfast, were tea (29%), water (22%) and coffee (13%).⁵⁸ This is in line with the findings of the NFCS-1999 that the most commonly consumed food items in South Africa are maize, sugar, tea, whole milk and brown bread.⁷

The most frequently reported breakfast were “porridge only, with a drink” (81%), followed by “bread, toast or a roll with a drink” (77%).⁵⁸

5.4 In summary

SANHANES₂₀₁₂ found that most children were aware of at least some of the important benefits of eating breakfast⁹, yet 1 in 5 South African youth skip the meal, particularly as they get older.^{58, 59} Although food security issues played some role, behavioural and environmental factors were the main reasons stated by the children for not eating breakfast. In those South African children that did eat breakfast, the meal for mostly consisted of a carbohydrate staple of maize porridge or bread with added sugar, margarine and milk, or RTEC with milk.

6 Ideal breakfast that should be eaten by children

Despite scientific support for its importance, the composition of a nutritious breakfast is poorly defined. To date, only Spain⁶¹, Italy⁶² and the United States (US)⁶³ have proposed evidence-based standards to define a nutritious breakfast. These standards are briefly summarised below.

6.1 Evidence-based definition of the term ‘breakfast’

The US reviewers noted that the definition of breakfast has not been consistent across research studies⁶³, which complicates interpretation and comparison between studies⁵¹. They proposed that the following standard evidence-based definition be adopted: ⁶³

‘Breakfast is the first meal of the day that breaks the fast after the longest period of sleep and is consumed within 2 to 3 hours of waking; it is comprised of food or beverage from at least one food group, and may be consumed at any location.’

This definition includes a time range for the breakfast meal in relation to waking, which also serves as a cut-off point to help differentiate breakfast from a snack or lunch meal. The definition specifies the inclusion of at least one food group to preclude consumption of coffee, water, or other non-caloric beverages from qualifying as breakfast. The definition further does not specify location, recognising that children (and adults) might consume breakfast at a location other than at home, such as at school, work, a restaurant, or in transit.⁶³

6.2 Guidelines for a nutritious breakfast

The proposed US, Spanish and Italian evidence-based guidelines^{63,61,62} for a nutritious breakfast are summarised from the literature and translated into appropriate food choices in Table 1 and 2, respectively.

The amounts of food consumed at breakfast, should be customised to fit within a daily healthy eating pattern according to the individual’s energy needs. Depending on the number of meals and snacks that a given child eats per day, breakfast should provide between 15% and 35% of total daily energy.⁶¹⁻⁶²

All three sets of guidelines agree that breakfast should contain nutrient-dense carbohydrate-rich foods, in a combination of cereal or grain, fruit or vegetables, and dairy.^{61,62,63} Evidence suggest that carbohydrate-rich foods with a low glycaemic index for breakfast, provides a continuous supply of glucose that facilitates better cognitive performance.¹³ Sweetening grains, for example pre-sweetened RTEC,⁶³ a small amount of added sugar to cooked cereals, or a little jam, syrup or honey on bread, can help improve palatability and, thus, consumption of whole grains.⁶³ Although studies are limited there appears to be no association between presweetened RTEC and body weight when they are consumed in moderation.⁶³

Ideally, breakfast should also include protein-rich food, with attention to type and amount of fat and levels of sodium.⁶³ These may include low fat and fat-free dairy, egg or lean meat. Legumes and nuts, which may, for example, be added to cooked cereal, RTEC or bread at breakfast, may also contribute to improved overall dietary quality.⁶³

The guidelines suggested for Italy, also acknowledges the body of evidence that suggest that children from families that eat meals together, show better food choices and better dietary quality, and are more likely to consume breakfast.^{19,62} In addition, it draws on the large body of evidence that supports the health benefits of a Mediterranean type diet⁶⁴, and recommends the addition of a moderate amount of fats and oils with a good fatty acids profile (low in saturated and trans fats, high in mono-unsaturated fatty acids and omega 3 fatty acids).⁶² In the South African context, a teaspoon or two of low fat margarine, is ideally enriched with micronutrients and omega 3 fatty acid, could be added to cooked cereal like maize porridge or wholegrain bread at breakfast.

Table 1: Evidence-based guidelines for a nutritious breakfast^{63,61,62}

Component	Criteria
Energy	<p>US: 15% to 25% of recommended total calories, based on age, gender, and activity level. From a mix of carbohydrates (eg, fibre-rich whole grains, fruit, low-fat/fat-free dairy), lean protein, and healthy fats.</p> <p>Spain: 20% to 25% of total daily energy</p> <p>Italy: 20 to 35% of total daily energy</p>
Nutrients and components with positive health effects (ie, micronutrients, fiber)	<p>US: Meet a minimum of 10% of Daily Value for as many nutrients as possible, with the goal of 20% or more for as many nutrients of concern as possible.</p>
Food components to reduce	<p>US: Consider amounts of sodium and saturated fat in individual foods in the context of daily allowances and meal patterns (eg, the daily recommendation for sodium is <2,300 mg. As a rule of thumb, if four eating occasions a day, then aim for <25% of the Daily Value for saturated fat and sodium at each one). Limit foods that provide calories with few nutrients. (Quantified guidelines for added sugars are not provided due to the lack of readily accessible data available for consumers. Added sugars can be identified in the ingredient list, and are combined with naturally occurring sugars as “Total Sugars” listed on a food label.)</p> <p>Spain: Foods rich in simple sugars (sugar, jam, honey) should not contribute more than 5% of total daily energy; Avoid foods rich in trans fatty acids and limit saturated fatty acids</p>
Food groups to include	<p>US: Aim for contributions from at least 3 food groups, such as fibre-rich grains, non-fat or low-fat dairy, fruits/vegetables, and lean proteins.</p> <p>Spain: Include at least cereals, fruit/vegetables, dairy products</p> <p>Italy: include at least milk and milk-derived products (low fat); cereals (preferably whole grain, unrefined), and fruit (fresh fruit or natural juices; no sugar)</p>
Portion sizes	<p>US: Appropriate for age, gender, and daily energy requirements.</p>
Nutrient-dense foods and beverages	<p>US: Choose foods that deliver a balance of nutrients needed for health, relative to calories provided</p> <p>Spain: Ideally breakfast should provide 200–300mg calcium</p>
Fats	<p>Spain: May include MUFA-rich fats (olive oil, vegetable oil)</p>
Other	<p>Italy: All the family should eat breakfast together; Parents should set a ‘good example’, Foods included should be palatable and pleasant, as well as healthy with a good balance of macronutrients and micronutrients</p>

Table 2: Evidence-based breakfast food choices summarised from the literature^{63,61,62}

Food type	Criteria for inclusion	Good choices	Nutrient contribution
Nutrient-dense^a carbohydrate-rich food	Supply energy and replenish glycogen stores after an extended period of fasting	Whole cereals and bread, fibre-fortified grains, fibre-rich ready-to-eat cereal (RTEC) and bran-based grain foods	Carbohydrates, B vitamins, fibre, iron, zinc
	Contributes vitamins, minerals and protective phytochemicals Contributes towards daily fibre intakes that: <ul style="list-style-type: none"> • Play a protective role in heart disease, cancer, digestive diseases, and obesity • Improve appetite control and increase satiety • Decrease glycaemic index of the meal, thus providing a source of sustained energy that keep blood glucose levels more constant 	Fruit and vegetables, (unsweetened preferably fresh)	Fibre, vitamin D [fortified 100% fruit juice], calcium [fortified 100% fruit juice], potassium, other shortfall nutrients (ie, vitamins A and C and folate). Protective phytochemicals Also naturally low in saturated fat, added sugars, and sodium.
Low fat, low sodium protein-rich foods	Omission at breakfast can make it difficult to meet daily nutrient and food recommendations.	Low-fat and fat-free dairy products ^b	Carbohydrates, vitamin A, vitamin D, riboflavin, calcium, potassium
	Improve satiety	Eggs	Vitamin A, vitamin B ₁₂ , potassium
	Lead to positive alterations in the appetitive, hormonal, and neural signals that regulation food-intake	Lean meat	B vitamins, zinc, iron, choline
	Reduce evening snacking compared with breakfast skipping	Legumes	Fibre, folate, zinc, iron, magnesium
		Nuts	Monounsaturated fatty acids, polyunsaturated fatty acids, dietary fibre, vitamin E, vitamin K, folate, magnesium, copper, selenium, potassium.

^a Nutrient- dense foods and beverages are defined as lean or low in solid fats, and minimize or exclude added solid fats, sugars, starches, and sodium. Ideally, they also are in forms that retain naturally occurring components, such as dietary fibre.¹⁹

^b Children from populations with a higher prevalence of lactose intolerance should be counselled concerning dairy foods that may be tolerated (eg, limited amounts of milk, certain cheeses) or alter- native sources of calcium.⁶³

6.3 In summary

Published evidence-based guidelines for the composition of the ideal breakfast makes it clear that there are many patterns for good breakfasts that contribute reasonable amounts of kilojoules and considerable amounts of nutrients which are lacking in children’s diets, whilst decreasing the content of nutrients to limit, like saturated fatty acids and sodium.⁶⁵ These can easily be translated for the South African population.

7 Entrenching a breakfast habit amongst South African children

The remaining challenge is to bring about sustainable change in the breakfast behaviour of South African children; thus, to increasing the number of children in South Africa that regularly consume a quality breakfast.

The **Five Levers for Change Model**, is a practical tool, developed by Unilever to promote healthy behaviour In accordance with the above social and behaviour theories.⁴

The process starts with systematically identifying the *barriers* (what are the things that stop people from eating breakfast regularly?), *triggers* (how could we get people to start eating breakfast?) and *motivators* (what are the ways to help them keep on eating breakfast regularly?). Some of these factors that have been identified in the scientific literature, include:

- i. Parents who regularly eat nutritious breakfast⁵¹, particularly in younger children and pre-teens;^{70,73}
- ii. Amongst adolescents, friend groups and best friends who regularly eat breakfast⁷¹ (suggesting that as children enter adolescence and start seeking more autonomy, their peer group starts exerting a bigger influence on their choices);
- iii. A supportive home environment, which is largely created by parents; ⁷²
- iv. Households with rules about breakfast eating; ⁷² and
- v. Having breakfast products available in the home.⁷²

Parents should therefore be targeted as agents of behavioural change in their children.⁵¹ For adolescents, programmes should consider to also engage friends to promote healthy dietary behaviours.⁷¹

Barriers to eating breakfast, include: ^{74,75,76}

- i. time and scheduling challenges;
- ii. cost; and
- iii. food preferences.

After considering barriers, triggers and motivators, the **Five Levers for Change**⁴ could be applied as follows to inspire people to eat breakfast regularly:

Make it understood: Consumers should be educated on why breakfast is important. Education efforts should respect individual preferences, cultural traditions and schedules. The disconnect between understanding that a behaviour is good for and actually doing it, suggests a need to enhance the attractiveness of breakfast messages by making them more personally relevant and meaningful.⁶³ Consumers retain messages better and are more prone to change their behaviour if messages are matched with their own sensibilities and interests. For example, most parents may be interested in the cognitive benefits and enhanced academic performance that is linked to regular breakfast eating, those worried about their children's weight, may be interested in the benefits of breakfast to maintain a healthy weight; others may respond to the idea of quality family time around the breakfast meal.

Make it easy:

Consumers should be helped to choose and prepare foods that comply with evidence-based norms for a healthy breakfast, in appropriate amounts, so that they become confident doing it.⁷⁷ It is important to offer explicit, realistic solutions to common barriers that influence both whether breakfast is consumed and the types of foods selected, including time, cost, lack of hunger, and

fear of weight gain. Studies show that consumer messages are most persuasive and effective in directly addressing barriers, when realistic solutions are offered, even with highly motivated and educated individuals.⁶³ Change is also easier if it is convenient. On-the-go and budget-friendly options are essential for busy consumers who may skip breakfast due to time or cost constraints. Innovative time-saving products or services have a potential role to play in addressing this barrier.⁶³

Make it desirable: Make everybody want to eat breakfast – in other words find ways to make it the societal norm which people will want to follow in order to feel positive about themselves as individuals, as well as in relation to others; one strategy is to use popular positive role-models as the face of a campaign to drive breakfast eating.

Make it rewarding: People want proof that the new behaviour works. People respond well to incentives - research shows that tangible rewards are crucial in bringing about large and sustainable behaviour change.⁷⁷ Small incentives to reward progress towards the overall long-term benefits, are also extremely effective in motivating people to continue with the behaviour.⁷⁸

Make it a habit: Once people have made a change, making the habit stick is difficult and requires constant reminding and reinforcing of the behaviour over an extended period of time. The so called habit loop essentially consists of a specific cue that triggers a very specific behaviour which leads to a specific reward.⁸⁰ Thus choosing and eating a healthy breakfast could be repeated daily in a memorable way, for a number of weeks in the same setting, to reinforce the behavioural response to the cue until it becomes engrained in the neurological pathways and can be maintained without effort. One central issue that has gained wide acceptance in recent years is the simple notion that behaviour change is a process, not an event.⁶⁷

Table 3: Example of tips for restructuring the environmental to promote breakfast eating

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| <ul style="list-style-type: none"> • Set out dishes, utensils, and non-perishable ready-to-serve foods, such as whole-grain bread or RTEC, on the counter the night before.⁶³ • Move refrigerated items, such as low-fat milk, yogurt, fresh fruit, and 100% juice to the front of the refrigerator shelf for easy access.⁶³ • Wash fresh fruit and cut it for fruit cups, and if using 100% juice from concentrate, prepare the night before.⁶³ • Blend together low-fat or fat-free yogurt, frozen fruit chunks, and 100% fruit juice for a grab-and-go smoothie.⁶³ • Layer fruit, cereal, and low-fat or fat-free yogurt in a to-go cup for a fruit parfait to go.⁶³ • Prepare hard-cooked eggs the night before so they are ready for a quick to-go breakfast or to make an egg sandwich with toasted whole-wheat bread.⁶³ • For individuals who may not feel hungry early in the morning, keep easily accessible nutrient-dense foods, such as trail mix, dried fruit, and fibre-rich cereal bars in the car, or in backpacks, purses, or briefcases to eat on the way to school or work.⁶³ • Maize porridge can be cooked the night before. Cooling it down has the added benefit of lowering the otherwise high glycaemic index of the dish. It can then be reheated in the morning, or eaten cold, served with low-fat milk or maas and a teaspoon of margarine which will further lower the glycemic index of the dish. |
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8 Addressing childhood malnutrition through ecological approaches to change health behaviours

Until recently, the emphasis for changes in health behaviour has been almost solely on the individual. Studies show, however that health-promotion interventions are most likely to bring about really sustainable behaviour change, if it takes an ecological approach that involve a broad range of sectors, occurs across a variety of settings, and addresses the needs of individuals, families, and communities.⁶⁴

A large part of what contributes to childhood malnutrition is essentially related to behavioural problems. As discussed, changing breakfast eating behaviour has the potential to simultaneously address childhood obesity, undernutrition and micronutrient deficiencies, but to be effective, it needs to occur at population level. Individuals and families cannot successfully entrench breakfast as a habit, if the environment and policies make it difficult to choose this healthful behaviour. Global evidence suggests that behaviour change is best accomplished when education is accompanied by policies that enable individuals to make and maintain healthy choices across their lifespan.

A supportive environment and policies that make eating a healthy breakfast fast, simple, affordable, and attractive,⁶³ are also required. Addressing behaviour change at the population level requires multi-stakeholder collaborations in which each stakeholder brings its own strengths to the table.⁴ The contributions of all stakeholders should be the consumer's wants and needs. As such, consumers as the people who will make informed decisions to make use of an intervention, are not just passive receivers, but the key drivers of change.⁴

A good example of how effective multi-stakeholder collaboration can successfully affect health behaviour among children on a community-wide scale, is the British *Food Dudes Healthy Eating Programme*.

8.1 'Food Dudes Healthy Eating Programme

This is a school-based intervention⁸¹ developed by the University of Wales, Bangor, to encourage children aged 2 to 11 years old, to eat more fruit and vegetables both in school and at home. The programme is ultimately designed to enable children to enjoy eating healthy diets, and to create a healthy eating culture within schools.^{4,82} Grounded in behavioural theory, the programme brings together more than 50 behavioural principles and processes, which work in combination over time to bring about sustained behaviour change. For example, it employs positive role models in the form of the four Food Dudes characters, who are older children who love eating fruit and vegetables. During a 16-day intervention at school (phase 1) children watch a series of video adventures in which these heroic characters battle against General Junk and his Junk Punks and frequently eat and extol the virtues of fruit and vegetables. These movies incorporate a range of social-norming and role-modelling principles.

The programme employs the principles of repetition and rewards to successfully affect behavioural change. The design of the programme is such as to also ensure that the children have to repeatedly taste the same fruits and vegetables, because research shows that repeated tasting of particular foods leads to increased liking of them.⁸³ Children are rewarded with small incentives (juggling balls, pedometers) for tasting fruit and vegetables they think they do not like. They also receive a *Food Dudes Home Pack*, which encourages them to eat more fruit and vegetables at home by involving their parents, as well as self-monitoring. During phase 2, the program continues to support successful eating of fruit and vegetables, but with less intensity than during Phase 1. Classroom wall charts are used to record consumption levels of these foods, and as the children achieve more advanced goals, they earn further rewards and Food Dudes certificates.⁸¹ In the process, children come to view themselves as 'fruit and vegetable eaters'.

Two large-scale randomised control trials^{78,84} that *Food Dudes*, found that it successfully and sustainably increased the number of children that brought fruit and vegetables to school in their lunchboxes across the primary age range, even at one year after the intervention, regardless of gender, school size, geographic and socio-economic factors. Based on the success of the pilot, the programme was scaled up to include all primary schools in Ireland with the support of the Department

of Health and many other organisations. Subsequently it has also been rolled out in England, Sicily and California.

8.2 Programmes that promote breakfast

Most intervention programmes to promote breakfast, have been focussed on providing learners with a free school breakfast meal. This approach, with and without education to support breakfast eating, has had mixed results, as discussed before; sometimes failing to bring about sustained change.⁸⁵

No evidence in the literature and media of large-scale programmes based on ecological principles (anywhere like the Food Dudes programme described above) was found to date. Interestingly, one of the first organised school breakfast food programs in the US, was actually a community-based programme incepted by the Black Panther Movement in Oakland, California in 1968. By the end of 1969, the Black Panthers were serving daily free breakfasts (including milk, bacon, eggs, grits, and toast) to 20,000 school aged children in 19 cities around the country, and in 23 local affiliates, every school day. Most of the funding for the program came from donations from within the communities being served.

In South Africa, the food company, “Tiger Brands Limited” allocates 5% of its dividends to The Tiger Brands Foundation which operates as a non-profit organisation. This Foundation established a in-school breakfast-feeding programme in resource-poor schools in 2010 to complement the NSNP. Currently the programme operates within 63 schools across seven provinces, serving breakfast to more than 40 000 learners daily. In addition, The Tiger Brands Foundation (TBF) has installed kitchens across Gauteng, KwaZulu–Natal, Western Cape, Eastern Cape, Mpumalanga, and recently Limpopo and the Free State, to create a more hygienic and efficient system to prepare the meals for the learners.⁸⁶ The overall finding of a study that evaluated the programme, was that the ‘TBF has introduced a model of school nutrition into vulnerable schools, in a way that respects the school staff, that intends to build capacity, and that is connected to rather than contrary to government programmes. The relationships and connections that have been built through the programme – such as those between the TBF and the school principals, and between the TBF and the DBE – should be seen as key success factors that are integral to similar future programmes and for scalability of the programme.’⁸⁷

9 Potential of the food industry to drive behaviour change regarding breakfast eating

The idea of applying commercial marketing principles such as advertising, combined with behaviour change theory, to influence behaviour for ‘social good’, as recently been developed and is referred to as ‘social marketing.’⁸⁸ By segmenting the relevant market, interventions are targeted.⁶⁶ There is really only a thin line between demand creation for a product category or a generic habit (such as promotion of breakfast consumption) and the advertisement and promotion of a branded commercial product (such as a specific brand of breakfast cereal); therefore food industry have enormous potential to affect behavioural change through public partnerships as part of an ecological approach.

In ecological intervention, academics may provide the scientific evidence base that lends credibility to the messages and public health services and nongovernmental organisations have the capacity can reach the most vulnerable target groups. Industry can contribute their expertise in innovation, production, distribution and marketing.

9.1 Consumer education

The food that people buy, are influenced by personal preferences, habits, nutrition information, availability, cost, and placement, among other things⁶⁷, which opens up many possibilities for targeted intervention to promote breakfast eating. The environment provides the resources and setting for individuals to apply their knowledge, motivation and skills (such as self-regulation), to perform behaviours, for example with regard to making a habit of eating a nutritious breakfast. To optimally affect behaviour change, health communications and interventions targeting improved breakfast behaviours need to consider these internal resources, as well as the environment. To build consumers' internal resources, food marketers can join health communicators, nutrition educators, health care providers, and public policy leaders, to translate the criteria for healthy breakfast habits into practical advice for consuming a quality breakfast.⁶³

9.2 Product development and marketing

Food industry can also drive ecological interventions to promote breakfast behaviour amongst children through the innovation, production, distribution and marketing of products⁴ that conveniently and affordably fit into the recommendations for a nutritious breakfast of the entire scope of the child population. Product innovations may be instrumental in bridging nutritional gaps not yet sufficiently met by public health programmes like food fortification and supplementation.

It is evident from the scientific literature that the diets of many South African children do not meet their requirements for protein, vitamin A, iron, calcium, zinc, vitamin D, and omega 3-fatty acids, amongst others. Products, for example breakfast cereals, spreads, and dairy or fruit-based beverages, that comply to evidence-based standards for a nutritious breakfast, can be fortified or enriched with these nutrients. Products can also be tailored to overcome some of the barriers to eating breakfast, such as time-constraints or fear of gaining weight.

10 Conclusion

Childhood malnutrition which is a global issue crossing socio-economic lines, which requires systemic change to be addressed.⁸⁹ SANHAINES₂₀₁₂ concluded that investing in nutrition of the population will lead to long-term benefits for the country.⁹ Combining academic and public health expertise in conducting evidence-based interventions with industry marketing power and consumer and health understanding will enable the delivery of long-term, practical solutions that will help to address the challenges of malnutrition through achieving behaviour for better health.⁴

The latest evidence-based guidelines recommend that nutrient-rich starchy food should form the basis of an ideal breakfast for children. Scrutiny of the available scientific data, indicate that maize porridge and bread are the well-established staples of South African children. Thus, porridge served with milk and a teaspoon of spread, ideally enriched with vitamins and omega 3 fatty acids, or alternatively, brown or whole wheat bread with enriched spread, could form the basis of an ideal breakfast for children. The addition of a fruit or small portion of fruit juice, and a protein food with a good fatty acid composition, like peanut butter, boiled or poached egg, a small handful of nuts, or a small portion of lean meat or cheese, could guarantee an affordable and convenient South African breakfast.

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