



# Summary Report

Baseline Information on Diet and Physical Activity amongst Youths and Adolescents for Non-Communicable Diseases Prevention in South Africa

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# LIST OF ABBREVIATIONS

<b>BMI</b>	.....	Body mass index
<b>DoH</b>	.....	Department of Health
<b>DBE</b>	.....	Department of Basic Education
<b>DSD</b>	.....	Department of Social Development
<b>FBDGs</b>	.....	Food-based dietary guidelines
<b>FGDs</b>	.....	Focus group discussions
<b>ISHP</b>	.....	Integrated school health policy/programme
<b>LI</b>	.....	Low income
<b>LMIC</b>	.....	Low and middle-income country
<b>LMI</b>	.....	Low-middle-income
<b>LO</b>	.....	Life orientation
<b>LS</b>	.....	Life skills
<b>MVPA</b>	.....	Moderate to vigorous physical activity
<b>HI</b>	.....	High income
<b>HIC</b>	.....	High-income country
<b>HAKSA</b>	.....	Healthy Active Kids SA
<b>MHI</b>	.....	Middle to high income
<b>NCD</b>	.....	Non-communicable disease
<b>NSNP</b>	.....	National School Nutrition Programme
<b>PA</b>	.....	Physical activity
<b>PE</b>	.....	Physical education
<b>SA</b>	.....	South Africa
<b>SADHS</b>	.....	South African Demographic and Health Survey
<b>SANHANES-1</b>	.....	South African National Health and Nutrition Examination Survey
<b>SEM</b>	.....	Social-ecological model
<b>SES</b>	.....	Socio-economic status
<b>SSBs</b>	.....	Sugar sweetened beverages
<b>WHO</b>	.....	World Health Organisation
<b>YRBS</b>	.....	Youth Risk Behaviour Study

# GLOSSARY OF TERMS

<b>Adolescence</b>	.....	Defined by the World Health Organisation as the period between ages 10 and 19 years <sup>1</sup> . Adolescents is the present participle of the Latin word adolescere and it means ‘growing up’ <sup>2</sup> .
<b>Adulthood</b>	.....	The age of majority, the legal term for ‘adult’, is 18 in SA <sup>3</sup> . This age differs for the activity in question though and so no single age to define adulthood exists in law.
<b>Child</b>	.....	The Bill of Rights and the Children’s Act define a child as a person under the age of 18 years in SA <sup>3</sup> .
<b>Junk foods</b>	.....	Energy-dense food and drinks high in sugar, fat, salt and low in micronutrients and fibre
<b>Teenager</b>	.....	Refers to people aged 13–19 years <sup>2</sup> .
<b>Young people</b>	.....	Refers to people aged 10–24 years, also known as adolescents and young adults. This age group is often divided into 3 categories in research to assist in examine the changes in health during each of these time periods: 10–14 years (early adolescence); 15–19 years (late adolescence); and 20–24 years (young adulthood) <sup>2</sup> .
<b>Youth</b>	.....	The United Nations defines youth as people aged between 15 and 24 years <sup>4</sup>

# 1. EXECUTIVE SUMMARY

**Between November 2020 and May 2021, a comprehensive study was carried out on diet and physical activity (PA) in 10-to-19-year-olds and 20-to-24-year-olds. This entailed a comprehensive literature review, scoping policy documents, identification of interventions led by youth, and identification of vulnerable groups. Additionally, focus groups were consulted in 4 provinces and 3 Internet of Good Things (IoGT) polls were conducted. The combined activities have resulted in the key findings and recommendations that follow. It is greatly encouraged that these are accepted and implemented at the highest ministerial levels of the Department of Health (DoH), the Department of Basic Education (DBE), and other relevant departments to bring about effective changes to the current situation.**

## 1.1. LITERATURE REVIEW

An unhealthy diet is a well-researched modifiable risk factor for non-communicable diseases (NCDs)<sup>(5-7)</sup>. The Global Burden of Disease (GBD) Study 2017 outlined the morbidity and mortality resulting from poor dietary intake in 195 countries<sup>8</sup>. It was demonstrated that suboptimal dietary intake was responsible for more deaths than any other risk factors for NCDs globally and that 20 per cent of deaths can be prevented by improving diet. Physical inactivity is estimated to cause 6 per cent of cardiovascular disease, 7 per cent of type 2 diabetes, 10 per cent of breast cancer, and 10 per cent of colon cancer cases globally<sup>9</sup>. If physical inactivity was decreased by 10 per cent, approximately half a million premature deaths could be prevented<sup>9</sup>. This number would increase to 1.3 million if physical inactivity was decreased by 25 per cent<sup>9</sup>. In a country like South Africa (SA), which has a heavy burden of both infectious and non-communicable diseases, diet and PA must be prioritised. This is especially important amongst adolescents and youth to curb the rising obesity epidemic over the next few decades and the associated medical costs.

From the literature review conducted, it was found that dietary intake amongst adolescents was mostly influenced by home and school environments as well as the availability and cost of foods in their neighbourhoods. Lack of dietary knowledge among learners and educators saw a low intake of fruit and vegetables, an elevated intake of foods high in fat, sugar, and salt, and adolescents skipping breakfast<sup>10</sup>. There was little evidence that the food-based dietary guidelines (FBDGs)<sup>11</sup> for SA were included in the school curriculum and taught to learners. The school environment is characterised by the selling of unhealthy foods around the school premises and regular consumption of unhealthy over-the-counter snacks by learners.

**The 2018 Systematic Review Report Card for SA provides a summary of the factors impacting the levels of PA among children and adolescents<sup>12</sup>.** The highest grade on the report card was a 'C'. This grade was given for overall PA, active transportation, and governance. The grade relating to governance indicated that while the National School Sport Programme is listed as a core deliverable of the 2016-2017 strategic plan (Department of Social Development and Sport, Arts and Culture), compliance remains poor and evidence of policy implementation and evaluation was not available at the time.

## 1.2. POLICY SCOPING

South Africa has numerous policies that address the needs of adolescents and youth. These include the Integrated School Health Policy (ISHP)<sup>13</sup>, the National School Nutrition Programme (NSNP)<sup>14</sup>, and the Adolescent and Youth Health Policy (AYHP) 2017<sup>15</sup>, which refers to an interdepartmental committee to support, monitor and implement the AYHP.

Both the ISHP and the NSNP have important objectives aimed at adolescents and youth. The NSNP aims to provide healthy meals to disadvantaged children within certain criteria. Unfortunately, research has shown that there are limitations regarding the provision of fruit and vegetables under policy and health guidelines. The ISHP is an impressive policy that addresses many of the country's essential health issues but it does not place sufficient emphasis on diet and PA, especially considering the high levels of overweight and obesity amongst adolescent girls. This is also largely due to the unhealthy school environment in terms of diet and PA. Body mass index assessments (BMIs) are not done sufficiently and there is no follow-up for those who have a BMI  $\geq 25$ . A review of CAPS grades 7-12<sup>16</sup> indicated that less than 7 hours of nutrition in total was taught in the life orientation (LO) curriculum.

It is strongly recommended that the AYHP be established to ensure that the policy objectives are met. Whilst the policy includes specific interventions regarding diet and PA in adolescents and youth, it does not feature precise targets. It is recommended that the specific targets and indicators should be aligned to global and other UN recommendations. It is important that regular monitoring and evaluation be done to meet the objectives for which targets have been set. This also applies to the ISHP and the NSNP.

## 1.3. PEER-GROUP-LED INTERVENTIONS FOR DIET AND PA

Most peer-led interventions were found in high-income countries. Only one was found in SA<sup>17</sup>. Interventions specific to a particular chronic condition, one that is highly prevalent among adults, should be considered. This was implemented in India<sup>18</sup> where the intervention focused specifically on diabetes and resulted in positive outcomes. Part of the success of the programme can be attributed to the comprehensive and integrated approach illustrated below using Socio-Ecological Model (SEM) principles. One

significant change in policy was replacing unhealthy foods at school with healthier options.

Components introduced in the Indian programme included: dissemination of health-related information through lectures and focus group discussions (FGDs); promotion of PA; activities to promote a healthy lifestyle; individual counselling; policy level changes in the school; involvement of teachers and parents, and training of student volunteers to sustain the programme<sup>18</sup>.

## 1.4. VULNERABLE GROUPS

Ten groups vulnerable to the development of poor diet and PA were identified. They include pregnant teenagers, youth with obesity, youth in single-parent households, orphaned children living in institutional care, unemployed youth, alcohol or substance-dependant youth, youth with HIV, youth with disabilities, youth living with abuse or conflict, and youth living with depression. 31.3 per cent of 15-to-19-year-old females were classed as overweight or obese according to the South African Demographic Health Survey (SADHS)<sup>19</sup>, compared to 9.6 per cent of males. In the 20-to-24-year-old group, 60 per cent of females were overweight or obese compared with 14.5 per cent of males. A high BMI carries an increased risk of developing NCDs in later adulthood.

## 1.5. FOCUS GROUP DISCUSSIONS ON DIET AND PA

Fourteen FGDs were held in the Western Cape, Eastern Cape, Gauteng, and Limpopo amongst 10-to-14; 15-to-19, and 20-to-24-year-olds. Some of the pertinent findings are detailed below.

The age category 10-to-14 years were, in most of the settings, more focused on what they ate and how it impacted them now rather than in the future. Common unhealthy dietary habits that came up among the participants were skipping meals, constant eating, a lack of exercise, and not following a balanced diet.

Across the groups, the data revealed that friends played a prominent role in influencing one another to partake in PA, with these influences being more common among the younger age groups. The school environment, across the first 2 age groups, was highlighted by many participants as having tuck shops filled with “junk foods”. The main components that arose were the impact of supermarkets and vendors in the area based on what foods they had available.

Regarding PA, safety was a factor and playing soccer in the streets was believed to be a community annoyance that was problematic and noisy for neighbours. In the total population, only 9 participants (10 per cent) stated that they had heard of the FBDGs and were able to comment on them. Participants agreed that an emotional component was often related to the development of weight issues such as stress, depression, or a lack of self-esteem. Participants spoke of not being able to resist unhealthy foods, being addicted to them, loving and needing them.

Taste was closely tied to affordability and availability of food, these being other challenges highlighted across all groups to following a healthy diet. Unhealthy foods were described as readily available and cheap in comparison to healthy food, which many participants stated were challenging to find in their communities. Advertising of “junk foods” also influenced choices. In order of importance, social media, watching television, laziness, availability of facilities, and having enough time were all challenges that affected participants’ physical activity.

## 1.6. INTERNET OF GOOD THINGS POLLS ON DIET AND PA

Three polls were conducted through the Internet of Good Things (IoGT) platform. The first poll focused on dietary knowledge whilst the second included questions relating to food availability in the home, PA knowledge and behaviour, and the family history of health conditions. The third poll was based on dietary behaviour. The response rate for the first poll was higher (N=292, compared to the 2nd and 3rd polls that generated less than 100 responses). The summary of the findings presented here focuses on the first poll, which determined dietary knowledge. Overall, only 15 per cent of the group knew that 5 or more servings of fruit and vegetables were required per day. This small segment constituted 51 per cent females and 49 per cent males. 30 per cent of the children in the overall group knew the requirements for dairy products and 34 per cent knew that pilchards were a source of healthy fats. Surprisingly, 81 per cent knew that sugar-sweetened beverages (SSBs) could lead to becoming overweight and 90 per cent understood that takeaways frequently contain excess fat and salt. Females generally scored better than males on most questions and the youngest group generally scored lower than the older groups with just 18 per cent understanding that drinking SSBs daily could lead to overweight/obesity. When all participants were asked about the healthiest way to maintain their weight, only 46 per cent knew the correct answer of which 62 per cent were females and 37 per cent were males. 54 per cent of participants knew the correct answer to NCDs resulting from an unhealthy diet. Of these, 65 per cent were females and 34 per cent were males. This case is not conducive to youth following a healthier diet.

## 1.7. STAKEHOLDER INTERVIEWS

Interviews were held with stakeholders from various sections within the National DoH, the National Youth and Development Agency, the DBE and the World Health Organisation (WHO). The interviews were either conducted via Zoom or, where connectivity issues were present, respondents answered the questions in written format. Interviews were conducted during February 2021. The stakeholders interviewed highlighted the following critical issues regarding diet and PA that should be prioritised amongst adolescents:

### Summary of findings regarding diet:

- Advocating for health promoting schools is critical.
- Revisiting the DoBE LO curriculum on nutrition and PA is important as most stakeholders were unsure of

what was included in the LO curriculum concerning nutrition and PA. Additionally, there appeared to be a lot of competition for the curriculum platform.

- There is a need to work on improving food sold at schools, specifically relating to the tuckshop policy.
- There is a need to “do something” about marketing and advertising unhealthy foods.
- The notion that healthier foods are expensive requires creating an environment that enables young people to eat healthy meals and snacks.
- Peer pressure, which may prompt poor food choices amongst young people, should be addressed.
- The lack of dietary knowledge, which leads to poor portion control, should be addressed.

### Summary of findings regarding PA:

- The safety of learners outside of schools when taking part in physical activities is a concern and should be addressed.
- The resources for conducting physical activities at schools and availability of sporting activities should be determined.
- Young people spend too much time on screens and social media which hinders PA.
- There is a need to work with the Department of Social Development (DSD) and Sport, Arts and Culture to promote PA.
- There is a lack of knowledge around the importance of PA and health.



## 1.8. KEY MESSAGES AND RECOMMENDATIONS

### » Policy gaps

A broad range of policies and strategic documents exist across several government departments in SA. In policies that aim to improve the diet and PA levels among South Africans, most only mention the population as a whole, or just certain groups and do not always cover diet and PA in adolescents and youth specifically. They seldom place equal emphasis on both diet and PA. Where strategy documents exist, these should be translated into action

plans with SMART targets and indicators that are aligned to the global, WHO and other United Nations (UN) recommendations. This applies to draft policies, strategies and plans that are currently in development or have yet to be developed.

In this research, family and school environments were identified as the key barriers to adolescents achieving a healthy diet. At the time of this study, policies that relate to the marketing of unhealthy foods to children, adolescents, and youth (as well as those that determine the school food environment) were not in place. It is recommended that these policies are urgently implemented. The Blueprint for improving the South African School Environment should be adopted and put into effect. It is recommended that the school is used as a key influence on families and the surrounding community to address the barrier of the home and surrounding environment not being supportive of healthy diets.

### » Policy coordination

This research highlighted a need for an interdepartmental coordination structure between the government departments (DoH; DBE; DSD and Sport, Arts and Culture; Planning, Monitoring and Evaluation; Agriculture, Land Reform and Rural Development; National Treasury; Communications and Digital Technologies; Women, Youth and Persons with Disabilities). This needs to include national, provincial, municipal and district levels in partnership with entities such as the South African Local Government Association that have a role to play in ensuring adolescent and youth health. The proposed coordinating structures in the National Food and Nutrition Security Implementation Plan (2018-2023) is readily placed to take this role.

It is recommended that all of the current programmes and initiatives aimed at preventing poor diet and PA among adolescents and youth are prioritised by these structures once they are established. This should include information on who is responsible for each of the programmes, who is supporting the programmes (and in what way), and the resource allocation. Amongst other things, this will help identify gaps, duplication, and resource needs. Dedicated funding will be required for interventions aimed at improving the health of adolescents and youth.

Safety was a key barrier to adolescents and youth participating in PA outside of school hours. Collaboration with other stakeholders such as the municipality, police services, and/or neighbourhood security structures may be required to address this barrier.

### » Need for updated Nutrition and PA Guidelines aimed at Adolescents and Youth.

**It is recommended that the FBDGs form the basis of the nutrition messages aimed at adolescents and youth, and are tailored and packaged in a way that applies to them specifically.** It is recommended that any PA messages for adolescents and youth are based on the latest WHO recommendations (published in 2020) and that updated PA guidelines are introduced in SA.

» **Need for an Independent Review of the School Curriculum relating to Diet and PA.**

It is recommended that an independent nutrition, PA and education specialist (public health) should review the contents of the nutrition and PE components of the LS and LO curriculum and update them to be in line with the latest evidence. It appears that the food groups rather than the FBDGs are being taught as part of the current curriculum. Additionally, the inclusion of the topic of NCDs, their risks, and content should increase in complexity as students move into higher grades. The research indicated that 10-to-14-year-olds would benefit from learning that an unhealthy lifestyle could lead to the development of NCD as they seemed to be less aware of this than the older groups were.

Sufficient time needs to be allocated to both nutrition and PE in the curriculum and should be taught by educators that have sufficient knowledge and training to teach these subjects. **This may only succeed if it comes from the highest level of the DBE and the DoH rather than through middle management structures.**

» **It is recommended that PE is reintroduced as a standalone compulsory subject**

PE educators will need to be re-skilled and equipped to deliver lessons with the necessary facilities and resources, keeping in mind that the curriculum is a highly contested space.

However, if we are to reduce the prevalence of NCDs in future generations, this needs to be given attention at the highest tiers and these directives should come from the ministerial level. The adolescents involved in this research indicated they had difficulty in achieving health-related goals. **It is recommended that skills related to setting achievable goals and overcoming barriers to achieving them should form part of the curriculum.**

» **Monitoring and Evaluation of Current Policies and Programmes**

This research indicated that there is a need for continuous monitoring, evaluation, and improvement of current policies and programmes aimed at enhancing the health of adolescents and the youth. The policy, guidelines and curriculum gaps would be identified through this process and could be used to inform corrective actions. The National Youth Risk Behaviour Survey (YRBS) was recognised as an important monitoring tool and it is recommended that this research is conducted regularly.

Research to evaluate the ISHP and NSNP has revealed that there are implementation challenges relating to the physical assessment of children in schools (ISHP) as well as challenges relating to serving fruit and vegetables daily, timely delivery of foods, and insufficient food gardens. This also applies to policy initiatives meant to ensure that they are enforced. **It is recommended that 10-to-19-year-old females are nutritionally assessed regularly as part of the ISHP and that all overweight (BMI $\geq$ 25 kg/m<sup>2</sup>) children and adolescents are provided with the necessary support and follow-up to achieve a healthy growth trajectory. Providing an additional focus on quintile**

**1-3 schools could help identify and support groups vulnerable to the development of NCDs (i.e. previously stunted children).**

» **Involvement of Adolescents and Youth**

Adolescents need to be involved in decisions around their health, and services that are sensitive to their needs, non-discriminatory, and non-judgemental need to be tailored for them. Existing structures that are tasked with making health decisions concerning adolescents should ensure the inclusion of youth on these committees.

**There is an opportunity for adolescents and youth to lead initiatives that are focused on improving the health of their peers.**

Learnings from research conducted in India<sup>18</sup> and other countries with best practices could form the basis for developing a pilot intervention(s). According to this research, peers are a key influence on adolescent PA, and other forms of exercise (dancing, for example) should be considered in interventions aimed at improving the PA levels among youth. Social media is currently a barrier to PA and healthy diets among this group but could be used as a positive influence. Feedback from the FGDs indicated that social media is used to show photos of unhealthy foods to friends and peers as well as where these can be bought. They also see numerous adverts for unhealthy foods on social media.

» **Communications plan**

It is recommended that a national food and nutrition security communication strategy be operationalised to include specific communication plans targeted at young people, both in and out of school.

» **Operational Research**

South Africa needs to test research interventions aimed at schools to promote nutrition and PA that are unique to the local requirements. These should involve all the stakeholders and the communities as shown by the Indian holistic model which involves peers<sup>18</sup>.

» **Regular monitoring and evaluation of the NSNP, the ISHP, and the AYHP**

## 2. SUMMARY REPORT

**This section aims to summarise the findings of components 1-5 and to make key recommendations and form messages for those who are concerned or involved in the health of adolescents and youth. This section of the report includes the following:**

- Policy scoping to identify existing evidence, policies and strategies on NCD modifiable risk factors (i.e. diet and PA) amongst adolescents at global, regional and local levels.
- Evidence on NCD prevention initiatives led by youths.
- Epidemiological data and available information to identify high risk, underserved, or adolescent sub-groups vulnerable to NCD risk factors.
- Knowledge and attitudes of adolescents and youth on modifiable NCD risk factors with specific reference to dietary intake practices and PA habits amongst adolescents through loGT polls.
- Focus group discussions with young people on NCD modifiable risk factors.
- Results on the perceptions and experiences of key stakeholders concerning NCD prevention among adolescents.
- Key recommendations on fundamental issues emanating from the baseline findings on awareness of adolescents, gaps identified through policy scoping which should be considered when developing key messages, and advocacy tools for the prevention of modifiable NCD risk factors targeted at adolescents and youth.

The importance of this cannot be stressed enough in terms of addressing those modifiable risk factors which may ultimately lead to NCDs. The focus is on diet and PA knowledge, patterns, and behaviour.

For ease of reference, the above sections covered by the report are organised into 5 components.

### 2.1. INTRODUCTION

The SEM<sup>20</sup> has been used throughout this study, which has helped to identify different levels of influence on individual behaviour. These include intra- and interpersonal, organisational or institutional, community, and policy factors that influence each other. Questions relating to various aspects of the SEM, including policy, institutional, community, and individual aspects of diet and PA have been at the heart of the various components compiled. Accordingly, the summaries and messages will also be reflected in this manner. More detail on each component is available as a separate document. For each of the 5 components, the main findings and key recommendations/messages will be provided.

### 2.2. METHODOLOGY

The 5 components are listed below:

- 1. Literature review, policy and organisational/institutional guidelines**
- 2. Peer-led initiatives**
- 3. Vulnerable groups**
- 4. Focus group discussions and loGT findings**
- 5. Stakeholder interview reports**

**Component 1** consisted of a scoping review of policies aimed at adolescents and youth regarding diet and PA.

**Component 2** sourced intervention studies from various databases (PubMed, EBSCOHost, Scopus, Google Scholar) extending back 2 decades.

**Component 3** sourced descriptive data from various databases (PubMed, EBSCOHost, Scopus, Google Scholar) compiled within the last decade.

**Component 4** consisted of data collected via focus group discussions and loGT polls.

**Component 5** made use of stakeholder interviews from various health organisations and departments.

### 2.3. STUDY LIMITATIONS

Components 1-3 were literature-based and no particular limitations have been identified. However, components 4 and 5 made use of examples where 2 of the 3 loGT sample sizes were small and cannot be considered as nationally representative. This study was conducted during the COVID-19 pandemic and this influenced access to policymakers, key informants, and focus group participants. The small sizes of the polls also make it difficult to generalise the findings. However, we are encouraged by many similar findings when examining research studies in SA and abroad.

Initially, it was planned that the loGT platform would be utilised to conduct the 3 polls at regular intervals as the platform has more than 100,000 users. Another limitation of the study is the low samples for polls 2 and 3 due to the privacy issues that arose during this time by the service providers, which limited the ability to promote them.



## 3. COMPONENT 1.

### Baseline information on healthy eating and physical activity among adolescents and youth for non-communicable disease prevention.

#### 3.1. MAIN FINDINGS OF THE LITERATURE REVIEW

An unhealthy diet is a well-researched modifiable risk factor for NCDs<sup>5-7</sup>. A systematic analysis of the Global Burden of Disease (GBD) Study 2017, outlined the morbidity and mortality that resulted from poor dietary intake in 195 countries<sup>8</sup>. It was shown that suboptimal dietary intake was responsible for more deaths than any of the other risk factors for NCDs globally and that 20 per cent of deaths could be prevented by improving diet. Similarly, if physical inactivity was reduced by 10 per cent about half a million premature deaths could be avoided<sup>(9)</sup>.

There is an extensive global body of research relating to various dietary risk factors for NCDs among adolescents. Kupka et al.<sup>21</sup> published an overview of the available data on the diets of children and adolescents with a focus on low-and-middle-income countries (LMICs) in November 2020. The key findings were that a diet low in fruit, vegetables, and animal-source foods put children and adolescents between the ages of 0 and 19 years at risk of micronutrient deficiencies. At the same time, consumption of energy-dense, nutrient-poor processed foods is resulting in obesity.

##### 3.1.1. SELECTED DIETARY RECOMMENDATIONS FOR ADOLESCENTS

The *WHO Global Strategy on Diet, Physical Activity and Health*<sup>22</sup> recommends that member states draft national dietary guidelines that are based on evidence from local and international sources. At the time, the WHO indicated that dietary recommendations for populations and individuals should include the following:

- Achieve energy balance and a healthy weight
- Limit energy from total fat, shift fat consumption from saturated to unsaturated fats, and eliminate trans fats
- Increase fruit, vegetable, legume, whole grain, and nut intake
- Limit the intake of free-sugars and sodium, and favour salt that is iodised<sup>22</sup>.

South Africa does not have specific guidelines for adolescents but has developed food-based dietary guidelines (FBDGs) for those older than 5 years<sup>11</sup>. These are listed below.

- Enjoy a variety of foods
- Be active
- Make starchy foods part of most meals
- Eat plenty of vegetables and fruit every day
- Eat dry beans, split peas, lentils, and soya regularly

- Have milk, maas, or yoghurt every day
- Fish, chicken, lean meat, or eggs can be eaten daily
- Drink lots of clean, safe water.
- Use fats sparingly and choose vegetable oils rather than hard fats
- Use sugar sparingly and avoid consuming too many foods and drinks that are high in sugar
- Use salt sparingly and avoid eating too many foods that contain excessive salt.

##### 3.1.2. DIETARY RISK FACTORS AMONG ADOLESCENTS IN SA

In SA, Wrottesley et al.<sup>10</sup> conducted a review of available literature examining the nutritional status, dietary intakes and practices (as well as their determinants) in SA adolescents from 1994 to 2018. This review included 67 studies. Additional research among adolescents conducted after 2018 was included as part of the Component 1 literature review.

The review carried out by Wrottesley et al.<sup>10</sup> concluded that dietary intakes of adolescents were transitioning to energy-dense, processed foods high in sugar and fat but low in micronutrients. Factors furthering the development of increased weight and obesity among adolescents were irregular breakfast consumption, fewer family meals, increased snacking, and low levels of PA.



Research conducted by Okeyo et al.<sup>23</sup> found that there were gender-related differences in eating habits between adolescents in 16 secondary schools (quintiles 1-3) in the

Eastern Cape. Females had a higher frequency of eating sugary snacks and a lower frequency of eating breakfast than males. Females ate significantly more fried fish, pizza, fat cakes (fried dough pieces), hot dogs, candy, cake, and crisps. Compared to urban areas, the frequency of eating breakfast and sugary snacks was significantly higher in rural areas. A higher proportion of learners in urban areas consumed boerewors (beef sausage), hamburgers, and SSBs (purchased carbonated and soft drinks), while more learners in rural areas consumed cordial, a sweetened concentrate to which water is added.

The same team also assessed the food and nutrition environment at these schools, specifically the types of foods available, the implementation of government programmes aimed at ensuring a healthy lifestyle, and the nutritional knowledge scores of the learners<sup>24</sup>. The main food items purchased at school were unhealthy, energy-dense items such as fried flour dough pieces (fat cakes), chocolates, candies (sweets), and crisps or chips. Nutrition knowledge scores based on the FBDGs were poor for 52 per cent and 23.4 per cent of learners in grades 8 and 12 respectively. Female learners generally had significantly higher nutritional knowledge scores compared to their male counterparts<sup>24</sup>.

The majority of educators teaching nutrition (assumed to be taught in the LO curriculum<sup>24</sup>) had no formal training on the subject and their nutritional knowledge scores were poor, indicating a lack of familiarity with the FBDGs. Nutrition assessments, particularly BMI measures, as part of the ISHP were conducted on a few learners. It was found that the NSNP provided daily meals to 96 per cent of students<sup>24</sup>.

The research team also assessed the nutrition component of the ISHP and found that LO teachers and principals (88 per cent each) were most involved in the implementation of the ISHP. 45 per cent of principals maintained that the health screening service package was implemented at schools, followed by health education and promotion (36 per cent) and on-site service package (27 per cent). In the present study, 75 per cent of LO teachers in Further Education and Training (FET) and 69 per cent in senior phases indicated that nutrition education was provided. Only 31 per cent of LO teachers and 38 per cent of principals mentioned that nutrition assessments were conducted at their schools (unpublished data by Okeyo).

In KwaZulu-Natal (KZN), adolescent nutrition knowledge was also found to be low<sup>25</sup> and it has been shown that primary school learners in the Western Cape had intakes above the FBDGs for dietary fat, added sugar, and sodium. 30.4 per cent of learners were above the recommended range of intakes for dietary fat intake, 54.7 per cent were above the recommended range for added sugar intake, and 51.6 per cent were above the recommended range for sodium intake<sup>26</sup>.

### 3.1.3. SNACKING AMONG ADOLESCENTS

Unhealthy snacking behaviour is influenced by individual, socio-cultural, and physical-environmental pressures, namely factors relating to poor parenting practices, SES level,

family characteristics, improper social norms pressure, and lower knowledge and self-efficacy of adolescents<sup>27</sup>.



### 3.1.4. BREAKFAST (AND OTHER MEAL) SKIPPING AND FAMILY MEALS

Breakfast skipping has been identified as a dietary habit that is increasing among children and adolescents creating an impact on energy balance, dietary regulation, and the development of overweight and obesity<sup>28</sup>. This habit was identified in the overview of the diets of children and adolescents in LMICs<sup>21</sup> as well in the review of the nutritional status and dietary intakes and practices, and their determinants, in SA adolescents<sup>10</sup>.

The South African Health and Nutrition Examination Survey (SANHANES-1)<sup>29</sup> included questions relating to the breakfast consumption habits of 10-to-14-year-olds. It was found that 68.4 per cent of this age group ate breakfast before school and 19 per cent did not.

The majority of children believed that it was important to have breakfast to concentrate at school and to give them energy for the day ahead. The reasons for not having breakfast in the morning were: not being hungry early in the morning; not having food in the house; people at home not having breakfast; not being able to get up early enough and not being able to make their breakfast<sup>21</sup>.

Meal skipping, in general, is common among adolescents and regular skipping of one or more of the traditional main meals has been associated with poorer diet quality, lower intakes of energy and micronutrients, increased risk of central adiposity, markers of insulin resistance, and cardiometabolic risk factors<sup>30</sup>.

A cross-sectional study of children and adolescents from 0-17 years in the USA (N=1992) found that participating in  $\geq 5$  family meals per week was associated with greater vegetable intake among both older children and adolescents, and greater fruit intake among adolescents.<sup>31</sup>

When examining the effect of frequent family meals and weight status, the frequency of family meals correlated

negatively with BMI in girls and the number of hours they spent watching television or at the computer. It correlated positively with PA, regular meals, and vegetable consumption in adolescents of both genders among Polish 13-year-olds<sup>32</sup>. The lowest mean BMI was found in the group of adolescents eating family meals often, whilst the highest appeared in the group of young people who rarely ate family meals.

### 3.1.5. EATING AWAY FROM HOME

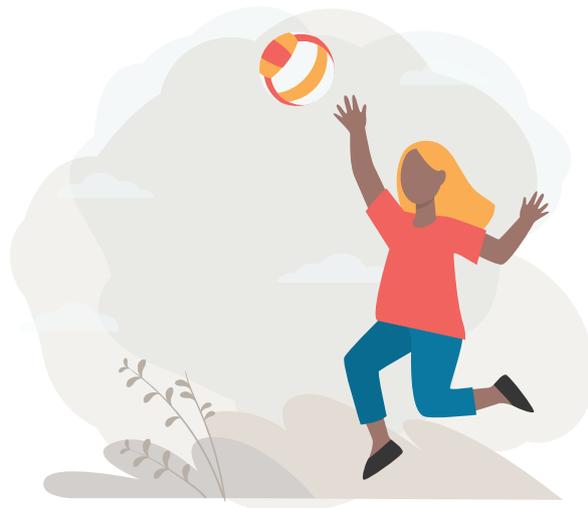
Children in middle childhood and adolescence frequently consume foods away from home, either at schools (through school feeding programmes and tuckshops) or vendors in and around schools<sup>21</sup>. The SANHANES-1 research indicated that more than half of children aged 10-14 years did not take a lunchbox to school and only 37.6 per cent of this age group did<sup>29</sup>. The most common reason for not taking a lunchbox to school was that the food at school was enough for the day. Other reasons were: there was nothing at home to put in the lunchbox; no one at home to help make the lunch; other children wanting their food, and not having a nice container<sup>29</sup>.

Just over half of the children in the SANHANES-1 research indicated that they took money to school whilst 33.2 per cent indicated that they did not and 15.5 per cent said they did so occasionally<sup>29</sup>. The research conducted by Okeyo et al.<sup>23,24</sup> indicates that although meals are provided to many learners through the NSNP, the foods from tuckshops and vendors at the secondary schools studied were not healthy.

An international cross-sectional study investigated fast food consumption in pre-adolescents and adolescents<sup>33</sup>. This study included 199,135 adolescents in 36 countries, including South Africa. It was found that frequent (once or twice a week) and very frequent (3 or 4 times a week) consumption of fast-food was reported at 79 per cent in SA<sup>33</sup>. Based on the study overall, it was found that reported fast-food consumption is high in childhood and increases in adolescence.

### 3.1.6. PHYSICAL ACTIVITY GUIDELINES FOR ADOLESCENTS

Physical activity guidelines exist in many but not all countries. South Africa has guidelines for PA among children and adolescents<sup>34</sup> but these were established 7 years ago and should be reviewed and updated to include recent evidence and address new barriers to meeting these guidelines that adolescents may be facing (e.g. as a result of technology).



The South African guidelines are:

*“At least 60 minutes of moderate- to vigorous-intensity physical activity per day. This can be accumulated in bouts of 10 minutes or more at a time. The one hour of activity is in addition to the incidental activity that children accumulate during the day. It can be achieved through participation in sports (school-based and non-school-based), games, natural play, and active transportation. Another means of meeting this guideline’s recommendation is to try and include family-based activities that promote physical activity. Activities that strengthen the muscles and bones of children should be performed 3 times a week<sup>26”</sup>*

### 3.1.7. PHYSICAL INACTIVITY AMONGST ADOLESCENTS IN SA

The 3rd South African National Youth Behaviour Risk Survey (YRBS) 2011<sup>35</sup> showed that 41.7 per cent of learners (grades 8-11) reported having sufficient levels of vigorous PA and 29.2 per cent indicated that they participated in sufficient moderate PA. Almost half (42.8 per cent) of the participants had levels of PA that would result in no health benefit. About two-thirds (67.8 per cent) of learners included PA as part of their school curriculum on one or 2 days per week. Reasons for not taking part in PA the week before the survey were that they: did not know the reason (31.8 per cent); did not want to participate (29.9 per cent); were ill (17.4 per cent); had no equipment and facilities (12.3 per cent), and felt unsafe or too frightened to go to the grounds (8.5 per cent). Almost a third of learners (30.3 per cent) had screen time for more than 3 hours per day.

The SANHANES-1 study<sup>29</sup> included 18-to-24-year-olds and data on their physical fitness based on a submaximal cardiovascular fitness test. 65.9 per cent of males and 38 per cent of females in this age group were found to be physically fit.

In 2016, it was found that 9-to-11-year-olds in Cape Town had a mean (standard deviation) of 64.9 (25.5) minutes of moderate-vigorous intensity PA (MVPA) per day and that their screen time was 3.3 (2.0) hours per day<sup>36</sup>. In 2018 it was found that, among 7,348 SA primary school learners

between the ages of 8 and 14 years, 57 per cent engaged in moderate levels of PA and 31 per cent did not meet the recommendations for MVPA at the time<sup>37</sup>. This data was self-reported, which has limitations. Other studies citing self-reported data in SA showed higher levels of PA with around two-thirds of children and adolescents found to be moderately active<sup>12</sup>.

In 2019, Hanson et al.<sup>38</sup> analysed data from the Birth-to-Twenty Plus Cohort (a longitudinal study of children in Soweto, Johannesburg) to identify patterns and associations between PA, sedentary behaviour, and sleep in adolescents. They found that 82 per cent of males and 100 per cent of females did not meet the WHO's recommendation for adolescents of at least 60 minutes of MVPA per day. In this study, organised sports are considered to be a proxy for MVPA. According to the authors, those that participated in organised sport had increased informal activity, which is consistent with other literature. It is therefore key that strategies to increase participation in organised sport are implemented.

It was found that there were similar patterns of overall PA trends among males and females, but that informal PA and organised sports were higher among males. Whilst PA decreased from age 12 to 17 years, 29 per cent of males and 17 per cent of females had maintained PA during adolescence.

PA behaviour is known to be influenced by diverse factors<sup>39,40</sup>. Hanson et al.<sup>31</sup> found that males with a higher SES (measured by a higher asset quintile) were more likely to fall into the 'increasing PA' trajectory rather than decreasing. They suggested this may be due to fewer household responsibilities and therefore more time for play and leisure activities. Both males and females in the higher socio-economic group were more likely to spend less time walking to school, implying access to other transportation options. Micklesfield et al.<sup>41</sup> found that among rural SA adolescents, lower SES was associated with less time spent partaking in school and club sports. It was suggested that adolescents living in urban areas, as well as older adolescents, may have greater access to these activities.

Hanson et al. found that sedentary behaviour among adolescents in the above-mentioned cohort was more than 2 hours per day. The new WHO PA guidelines recommend that sedentary behaviour is limited in children and adolescents to prevent adverse health outcomes<sup>42</sup>. The trajectories for sedentary behaviour were either stable or increasing over time among this cohort. Unlike other LMICs<sup>41,43</sup>, this study found that sedentary behaviour was not positively associated with SES.

Furthermore, it was not found that there was a decline in sleep time through adolescence among this group. Sufficient sleep (duration and quality) has been associated with regular MVPA<sup>44</sup>. The authors were not able to model PA with sedentary behaviour and sleep and concluded that they should be looked at as independent risk behaviours in the SA population.



Micklesfield et al.<sup>45</sup> investigated the relationship between PA, behaviour, sleep, anthropometry, and body composition at age 18 years in the Birth-to-Twenty cohort. It was found that males who were consistently more active and regularly walked to school during adolescence had a lower waist circumference, BMI, and body fat percentage at age 18 than those who had lower PA levels and did not walk to school. Invariably, sedentary females had a higher waist circumference than those whose sedentary behaviour increased over adolescence. Males that reported having 9 or more hours of sleep per night on school nights had significantly lower BMIs than those who reported sleeping 8 hours or less per night. The authors concluded that adolescent PA, sedentary behaviour, and sleep are modifiable characteristics that may be contributing to the prevalence of overweight and obesity in urban SA adults.

Qualitative research among female adolescents in Soweto conducted by Sedibe et al.<sup>46</sup> in 2014, also provides some insight into the low levels of PA among adolescents. Limited recreational and sporting facilities, as well as concerns around safety, were cited as reasons for limited PA participation in this study. In the same year, Mokabane et al.<sup>47</sup> raised concerns around the low levels of PA among female adolescents and the link to overweight and obesity. Their recommendation was to encourage schools to introduce or promote sustained PA during and after school through sports activities, and the establishment of community playgrounds.

More recently, qualitative research conducted by Wrottesley et al. in 2019 provides further insight into the facilitators and barriers to healthy eating practices, and PA among adolescents in Soweto<sup>48</sup>. Participants acknowledged that it was important to be physically active but it was only the older adolescents that were able to identify the link between PA and health. Some older adolescent girls believed that they did not need to be physically active if they ate healthily. Examples of PA acknowledged by

adolescents included organised sport and recreational exercise such as netball, soccer, rugby, basketball, and running. Younger adolescents mentioned group play such as skipping and hide-and-seek.

The adolescents in the study conducted by Wrottesley and colleagues<sup>48</sup> mentioned several positive influences on the amount of PA they did. These consisted of family members (adolescent boys), peers (adolescent girls), school (all adolescents through school-based programmes and classes, as well as teachers or coaches), media (younger adolescent boys and older girls, although caregivers thought that media and technology were responsible for inactivity among adolescents), and personal motivation (the most important influence amongst 15-to-17-year-old girls).

Various sources of motivation were given by the adolescents in the study by Wrottesley et al.,<sup>48</sup> including enjoyment, emotional well-being, and physical appearance (boys) and appearance (all girls). The main barriers to being physically active were facilities unavailable or unusable at school or in the community (main reason) and, where these were available, the equipment was vandalised and/or stolen. For young adolescent girls, weather (it gets dark earlier in winter) and safety were a big concern. Among older adolescent girls, time constraints and feeling lazy or tired were mentioned as challenges. Among 15-to-17-year-old girls, fears of weight loss and the desire to have a fuller figure were barriers.

In 2015, Draper et al.<sup>49</sup> conducted a scoping review to understand the impact of social norms and social support on PA and sedentary behaviour among adolescents. In the thirty reviews included, it was found that an authoritative parenting style had a positive impact on healthy behaviours, which included diet, PA, and sedentary behaviour. At the time, more research was required to understand parental and family influences on PA and sedentary behaviour better, as well as determining the effect of peer influences on these behaviours.

The 2018 Report Card for SA provides a summary of the status of factors impacting the levels of PA among children and adolescents in SA<sup>12</sup>. This is based on a systematic review using PubMed, Africa Journals Online, and Africa Wide (EBSCOHost) from January 2016 to March 2018.

The highest grade on the report card was a 'C'. This grade was given for overall PA, active transportation, and government. The grade relating to government indicated that while the Department of Sport and Recreation in SA's national school sports programme was a core deliverable of the 2016-2017 strategic plan, compliance to this programme remains poor and evidence of policy implementation and evaluation was not available at the time<sup>12</sup>.

A 'C' grade was assigned to family, peers, and community and environment metrics. This grade was based on little data and no evident change to the proportion of parents or peers supporting PA. Safety concerns for children and adolescents due to crime and traffic still exist, with no systematic approach to address these issues being evident. Organised sport participation received a 'D' grade due to no new strategies to improve participation<sup>12</sup>.

The rating for school was downgraded from 2018 because the proportion of children participating in school physical education (PE) is sub-optimal. It was found that SA had the greatest proportion of learners not participating in PE (32 per cent) out of 12 countries assessed, and children did significantly more MVPA outside of school than they did in school. Draper et al. indicated that there seemed to be *"no evidence of progress in the prioritisation of PE in the school curriculum/school environment"*<sup>12</sup>.

### 3.2. POLICIES AND GUIDELINES

There are 5 important WHO and 2 UNICEF guidelines that address the dietary and/or PA of adolescents and we believe that policymakers in SA could greatly benefit from their important principles.

**TABLE 1: WHO and UNICEF Guidelines for diet and/or PA among adolescents**

#### **i. Implementing effective actions for improving adolescent nutrition, WHO 2018<sup>50</sup>.**

The purpose of this publication is to facilitate the implementation of existing WHO guidelines and to identify the normative gaps in nutrition-specific or nutrition-sensitive actions required for improving health and well-being of adolescents. They include dietary and PA recommendations.

#### **ii. Health Promoting Schools<sup>51</sup>**

Ideally, every school should become a health promoting school. "A health promoting school can be characterised as a school constantly strengthening its capacity as a healthy setting for living, learning and working."

**iii. The Global Strategy for Women's, Children's and Adolescents' Health (2016-2030), WHO<sup>52</sup>**

This global strategy includes an update on the 2010 strategy and the rationale for investing in women's, children's, and adolescents' health. The document highlights the current health challenges faced by these groups and outlines specific action areas, as well as an operational framework for implementation of the actions.

**iv. WHO recommendations on sugar-sweetened beverages<sup>53</sup>**

WHO recommends a reduced intake of free sugars throughout the life course. In both adults and children, the WHO recommends reducing the intake of free sugars to less than 10 per cent of total energy intake. WHO suggests a further reduction of the intake of free sugars to below 5 per cent of total energy intake. The WHO also provides guidance on important interventions for achieving this goal.

**v. A framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children<sup>(54,55)</sup>**

This WHO framework provides policymakers with a set of recommendations relating to the marketing of food and non-alcoholic beverages to children. This document is critically important for the SA government to use as a framework for the marketing of foods and non-alcoholic beverages with a high content of fat, sugar and/or salt reaching children. Currently, there are no regulations in SA which protect children, adolescents and youth against companies which promote unhealthy products.

**vi. UNICEF Nutrition Strategy 2020-2030<sup>56</sup>**

This publication provides an essential diet and PA package for school-going children.

**3.2.1. KEY FINDINGS ON POLICY AND GUIDELINES**

A broad range of policies and strategic documents exist across several government departments in SA.

The Adolescent and Youth Health Policy (AYHP) 2017<sup>15</sup> refers to an interdepartmental committee to support, monitor, and implement the AYHP. It is strongly recommended that this structure is established to ensure that the policy objectives are met. The policy includes specific interventions regarding diet and PA in adolescents and youth. However, it does not feature specific targets. It is recommended that the specific targets and indicators should be aligned to the global and other UN recommendations. It is important that regular monitoring and evaluation be carried out to meet the targets for the objectives. The policy acknowledges this and outlines a framework for how this should be done.

Strategies relating to the prevention and control of NCDs, obesity and those relating to nutrition are now outdated in SA. Drafts that are already developed or have yet to be developed should include targets for improving the diet and PA levels of adolescents and youth specifically.

Several regulations that indirectly affect the diet of adolescents are in place in SA. Continuous monitoring and evaluation of regulations that either limit or make the inclusion of certain nutrients mandatory is required. In the case of trans-fats, it is recommended that the WHO's REPLACE action package<sup>57</sup> is implemented in SA

to eliminate industrially-produced trans fats from the food supply. Although SA does have regulations regarding trans fats, the WHO package contains additional information to assist regulators and policymakers. The draft regulations relating to labelling and advertising of foods need to be finalised to address the gaps in the current labelling and advertising regulations. It is hoped that the Front-of-Pack Labelling regulations will also be completed soon since they may be easier for adolescents to understand. Any funds generated through fiscal policies should be allocated to health promotion.

The ISHP, 2012<sup>13</sup> attempts to bring together health services, education, and the community to provide a comprehensive and integrated service to children and adolescents. While nutrition assessment and nutrition education are mentioned, there appears to be no mention of PA. This needs to be incorporated in an updated version of the ISHP.

A review of the LO curriculum is required and emphasis on outcomes related to both diet and PA are needed. This is based on the finding that from grades 7-12, nutrition education totals a mere 7 hours of the curriculum, and appears only in grades 7 and 11<sup>58</sup>.

The Blueprint for Improving the School Environment, 2021 encompasses all aspects of diet and PA in the school environment. It is backed by sound research and the evidence-based recommendations should be reviewed and implemented.

The National Food and Nutrition Security Plan (2018-2023)<sup>59</sup> incorporates activities that will have a positive impact on adolescent food and nutrition security. The National Youth Policy, 2020-2030 (Draft), Department of Women, Youth and Persons with Disabilities<sup>60</sup>, sets targets for PA but not for nutrition, which should be included before finalisation. There is an opportunity to learn more about the programmes run by the Department of Higher Education and Training (DHET) and to understand how these form part of the efforts to reduce diet risk factors and physical inactivity among adolescents attending colleges or universities in SA.

### 3.3. RECOMMENDATIONS ON INITIATIVES FROM THE SELECTED MIDDLE-HIGH INCOME COUNTRIES

The review of selected developed countries' initiatives did not yield many new concepts relating to improving the diet and PA levels among adolescents. A key learning from Australia was how their policy was translated into an action plan, which provides detail on how to achieve the policy objectives. SA would benefit from developing action plans for policies where these do not exist. Australia also had a Healthy Food Partnership, which is an innovative and comprehensive initiative to include the food industry and educate consumers<sup>61</sup>.

Ideas regarding specific initiatives related to diet and PA could be gleaned from these countries, however, they would need to be reviewed for applicability to SA. Learnings on how to successfully implement programmes did not form part of this review but may be of benefit to SA.

### 3.4. RECOMMENDATIONS ON INITIATIVES FROM SELECTED SUB-SAHARAN AFRICAN COUNTRIES

A key learning from Ghana is that their health policy includes training their health staff to deal with adolescents and youth in a non-discriminatory and sensitive manner<sup>62</sup>.

Nigeria's policy had a focus on behaviour change and enabling young people to take responsibility for their health. Their school feeding programme was based on procuring food from local smallholder farmers, thereby benefiting the schools and local communities<sup>63</sup>.

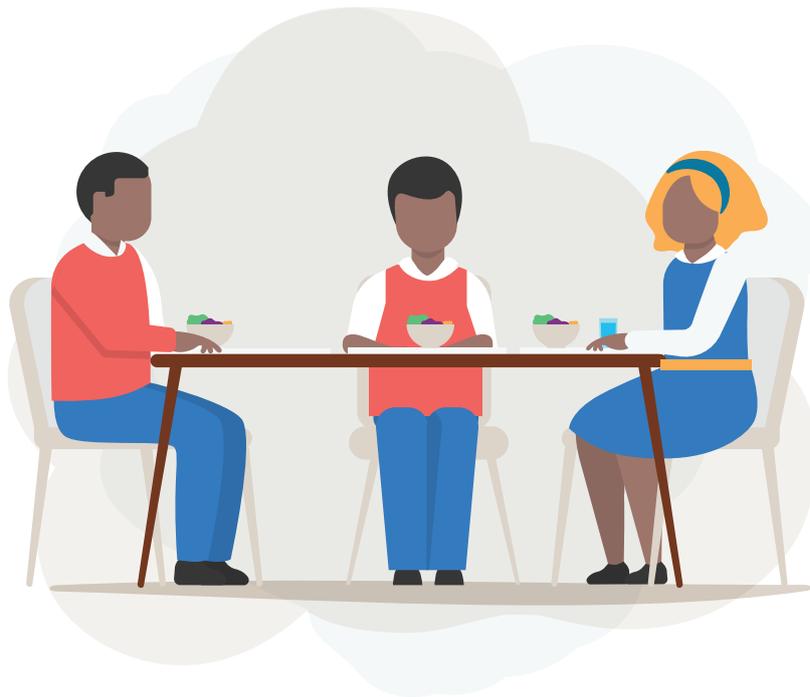
### 3.5. KEY MESSAGES

- » Policies aimed at improving the diet and PA levels among South Africans, and which currently only mention the population as a whole, or certain groups, should include adolescents and youth. Where strategy documents exist, these should be translated into action plans that outline how the strategies should be achieved.
- » It is recommended that the Adolescent and Youth Health Policy<sup>51</sup> introduce specific targets and indicators that are aligned to the global, and other, UN recommendations. It is important that regular monitoring and evaluation take place to meet the objectives for which targets have

been set. The policy acknowledges this and outlines a framework for how this should be done.

- » Strategies relating to the prevention and control of NCDs and obesity, and those relating to nutrition, are now outdated in SA. The ongoing review of the obesity and NCD strategies should include targets for improving the diet and PA levels of adolescents and youth specifically.
- » Several regulations that indirectly affect the diet of adolescents are in place in SA. Continuous monitoring and evaluation of laws that either limit or make the inclusion of certain nutrients mandatory are needed.
- » Certain important policies that could play a role in helping adolescents make healthy food choices (and reduce the influence of foods high in nutrients that should be limited) are still in draft form and need to be finalised as soon as possible. These relate to packaging and advertising regulations, including front-of-pack labelling, and the laws covering the marketing of foods to children, including adolescents. The WHO provides clear guidance on these matters and it is recommended that strict policies be put in place to ensure that adolescents are not exposed to the marketing of unhealthy foods<sup>65</sup>.
- » The ISHP, 2012<sup>13</sup> attempts to bring together health services, education, and the community to provide a comprehensive and integrated service to children and adolescents. While nutrition assessment and education are mentioned, there appears to be no mention of PA. This needs to be incorporated in an updated version of the ISHP. While the policy document is very specific about nutrition, the literature review has found that there are numerous implementation problems, particularly regarding the physical assessment of children.
- » The DBE needs to pay earnest attention to creating a healthy school food environment. This requires policy initiatives that include the implementation of existing guidelines on tuckshops, regulating the food industry's advertising in schoolyards, and dealing with vendors selling food around school premises.
- » There needs to be an emphasis on strong policy coordination between Department of Health; Basic Education; Social Development and Sport, Arts and Culture; Planning, Monitoring and Evaluation; Agriculture, Land Reform and Rural Development; National Treasury; Communications and Digital Technologies, and Women, Youth and Persons with Disabilities. This needs to include national, provincial, municipal, and district levels in partnership with entities such as the SA Local Government Association. Ideally, an interdepartmental coordination structure should be established. However, the proposed coordinating structures in the National Food and Nutrition Security Implementation Plan (2018-2023) are readily placed to take this role. In the policies and related documents that formed part of the review, both nutrition and PA should be emphasised as equally important aspects of adolescent health.

- » Adolescent and youth health policies need to be specific about the dietary and PA guidelines to be implemented and should address any specific risks to acquiring a healthy diet and being sufficiently physically active. Ideally, they should use the included SMART principles (specific, measurable, achievable, realistic, and timebound) in their implementation plans.
- » Adolescents need to be involved in decisions regarding their health, and adolescent-friendly services that are sensitive to their needs, non-discriminatory and non-judgemental need to be tailored for them. Existing structures tasked with health decisions regarding adolescents should ensure the inclusion of youth on these committees.
- » The WHO has specific country indicators<sup>64</sup> regarding adolescent health that should form part of the measures in assessing how SA is progressing in this area.
- » The information provided on life skills and LO regarding nutrition and PA is very general and unclear on what needs to be taught. However, when examining the curriculum for grades 7-12, it appears that the nutrition component is limited to a total of 7 hours of teaching, all of which is given in grades 7 and 11. The nutrition and PA components must be evaluated by independent experts in public health, nutrition, and PA to ensure that adolescents and youth understand these aspects and their effects on the development of NCDs.
- » The NSNP has been growing and improving over time and many adolescents now have access to meals. The meals provided are expected to be well balanced to encourage healthy eating in line with the FBDGs. The meals consist of daily/freshly cooked protein, starch, and vegetable or fruit. School food gardens are not funded but are supported through partner interventions thereby limiting the number of schools with these facilities. School gardens could be an opportunity to increase the consumption of vegetables by learners as part of the NSNP.
- » The Blueprint for Improving the South African School Environment, (DBE, DoH, 2020) should ideally be adopted and implemented. This will prevent the advertising and selling of unhealthy foods and instil a healthy school environment. Such initiatives should be instituted by the highest level of policymakers.





## 4. COMPONENT 2

### Diet and physical activity initiatives led by youth.

#### 4.1. MAIN FINDINGS OF THE LITERATURE REVIEW

A review of the literature has highlighted that there is a paucity of interventions in LMICs focusing on PA and nutrition education for youth that are specifically peer-led. There were a vast number of PA and nutrition interventions in the literature yet many of these were led solely by researchers or adult educators. The majority of the peer-led interventions were designed and implemented in higher-income countries such as the USA. The majority of these interventions were based on an SEM that emphasises the importance of implementing health promotion at an intrapersonal individual level as well as a broader environmental level<sup>65</sup>. We found 22 interventions that showed active participation by peers. South Africa, an upper-middle-income country, has delivered several interventions on nutrition and/or PA<sup>66-72</sup>, however, only one was found to be peer-led<sup>17</sup>.

The various interventions were delivered in numerous settings, including schools, universities, recreational centres, and in students' homes. Interventions that took place in schools had the benefits of being able to incorporate the intervention into health subjects that already formed the curriculum. Additionally, schools are a great environment for peers to connect and spread health intervention messages. Using the school environment as a tool for promoting health is beneficial.

University interventions are useful as there are peer leaders available for participation in fields of health sciences and there is a greater emphasis on sport and general fitness at this age. The use of recreational centres for a health promotion environment had the advantage of the intervention filtering into the community.

Going directly into an adolescent's home to deliver a programme provides personal and close delivery of the knowledge and skills to be learnt and can incorporate the whole family.

The importance of booster sessions being integrated into interventions was a prominent finding, with several longitudinal evaluation studies highlighting this as an issue that needs to be considered in the future<sup>73</sup>. Behavioural change was often not sustained over time among this age group, which is a prominent issue in behaviourally related health promotion programmes. The theory of behaviour change maintenance needs to be incorporated into the development of these programmes<sup>74</sup>. The self-determination theory argues that for behaviours to be maintained over time, individuals need to internalise the values and skills needed for change, thereby becoming self-determined. By focusing on an adolescent's experience of autonomy and competence,

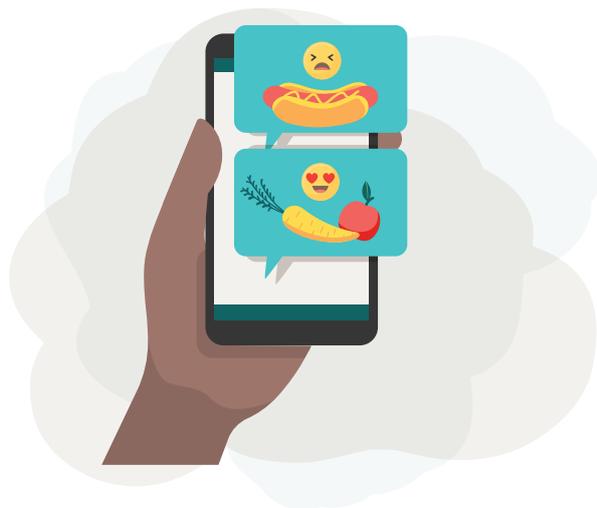
health-related knowledge and skills can be transformed into lasting behaviours that are more likely to be internalised and sustained<sup>75</sup>.

The inclusion and engagement of peer leaders/mentors in the development of health curricula and programmes can be beneficial and should be considered as a viable option. This may increase relevance and interest and could promote more youth-related beliefs and worldviews into the interventions.

The use of case-based learning<sup>72</sup> is another useful education technique that is practical and eye-opening to the realities of what life is like when living with a chronic condition. Case-based learning is also powerful when an example is discussed in a small group or classroom environment. Students can place themselves directly in the role of a health promoter or decision-maker associated with the topic and, by reading through the case, they can identify the problem, perform necessary analysis, and form recommendations<sup>76</sup>.

The use of environmental marketing techniques such as nutritional school posters and educational health signage were successful and had a good reach in several of the interventions<sup>77-79</sup>.

Another style of intervention that proved to be successful, and could assist in the issue of poor quality 'junk' foods being sold, is for trained peer leaders or class captains to spread nutrition education messages<sup>77,78,80</sup> during break and lunchtimes. This can be accompanied by nutritional education leaflets or bookmarks designed by students.



Technology can be a useful tool in current times with youth being well connected and often engrossed in their phones, computers, and games. One intervention made use of texting, emailing, and phone messages<sup>81</sup> for the promotion of healthy messages and for motivating students during PA where health goals had been set. This could be accompanied

by health and PA Facebook pages where students can join and receive support for achieving their set health goals.

Many of the interventions, especially those for the younger age groups, made use of games and fun activities<sup>82</sup> to educate students about health and PA. Physical activity games can be introduced during breaks and monitored by teachers, peer leaders, and class captains, with potentially even a point system introduced for healthy food incentives.

A frequent challenge was that the peer-led training workshops were not long enough and often did not incorporate group management and engagement in the training<sup>73,83</sup>. The inclusion of this into the training would increase the confidence and self-efficacy of the peer leaders, potentially leading to better programme outcomes.

Finally, some of the interventions highlighted that the implemented programmes consisted of too few educational sessions. The students receiving the lessons/activities often felt that the programme/curriculum could have been longer, especially when it came to nutrition and diet-related education<sup>77</sup>.

The introduction of interventions specific to a particular chronic condition that is highly prevalent among adults should be considered. This was implemented in India<sup>18</sup> where the programmes focused specifically on diabetes and had very positive outcomes. Part of the success of the programme can be attributed to the comprehensive and integrated approach using SEM principles, as illustrated

below. One significant change in policy was substituting unhealthy foods at school for healthier options.

Components introduced in the India Programme: (Table 2)<sup>18</sup>

- Dissemination of health-related information through lectures and focused group discussions.
- Promotion of PA.
- Other activities to promote a healthy lifestyle.
- Individual counselling.
- Policy-level changes in the school.
- Involvement of teachers and parents.
- Training of student volunteers to sustain the programme.

## 4.2. KEY MESSAGES

- Dissemination of health-related information can be done through lectures and focused group discussions.
- Interventions should be targeted at common NCD conditions e.g. type 2 diabetes, hypertension, and obesity. These should be part of the LO curriculum.
- Interventions should include fun activities and games to educate youth about diet and PA.
- The use of technology and social media should be used to improve diet and PA knowledge.
- Teachers who are certified in nutrition and PA should teach youth mentors.
- Policy-level changes at schools are required to provide healthy foods and ensure regular PA. These should be endorsed at the highest levels of government.

**TABLE 2: Characteristics of the Indian multi-component model of nutrition and lifestyle interventions<sup>18</sup>**

Component	Description
Dissemination of health-related information through lectures and focused group discussions	The lifestyle intervention included 24 weeks (6 months) of nutrition education. Initial 6 weeks were used for the introduction of the programme to the school and collecting baseline data. Subsequent 18 weeks were used for intensive and repetitive nutrition education to all eleventh-grade students. The students were given lectures in batches of 30 in each class in 30 min sessions each week for 10 weeks on the basics of food groups; importance of each food group for health; difference between simple and complex carbohydrates, concept of empty calories and its sources; importance of fibre in the diet; sources and adverse effects of trans-fats; sources of protein in the diet; harmful effects of consuming deep-fried, high-calorie Indian 'junk' food every day; antioxidant and fibre content of fruits and vegetables; and importance of eating nuts. Emphasis was laid on the importance of every food group in the diet. Information on healthy cooking practices was also shared. In addition, knowledge of lifestyle-related diseases such as diabetes, CVD and hypertension were provided to them.
Promotion of PA	Children were encouraged to participate actively in PA periods in school every week for at least 30 min. They were informed of ways by which PA can be improved at home, such as by decreased television viewing, increased involvement in household chores, using walking as a means of travel to nearby destinations.
Other activities to promote healthy lifestyle	After 10 weeks of lectures and information dissemination, for the consecutive 8 weeks (30min 5 days a week), children were involved in activities such as planning their snack, designing a daily diet for themselves, and listing healthy alternatives to high-calorie 'junk foods'. Quiz competition and extempore on health-related topics were also conducted during the activity periods.

Component	Description
Individual counselling	Individual counselling was held with the children for an hour each week by a trained nutritionist. They were counselled in groups of 4–5, with each child receiving individual attention. The children discussed their problems related to diet, lifestyle and PA. Hence each child received individual counselling of 1 h/week.
Policy level changes in the school	A policy-level change was introduced in the school with the help of the school management. The school canteen menu was changed to healthier alternatives. The sale of aerated drinks and high-calorie foods, such as burgers, bread pakodas (deep-fried Bengal gram flour-coated bread slices) and noodles were stopped. Healthy Indian food providing satiety such as rajmah-chawal (bean curry and boiled rice) kadi-chawal (Bengal gram flour curry and boiled rice), idli-sambar (fermented and steamed rice and pulse flour and red gram dhal with vegetables) and brown bread cucumber sandwiches were made available. This was done to reduce the availability of unhealthy foods to children as well as to make the healthy lifestyle programme sustainable in school.
Involvement of teachers and parents	A health camp was conducted in school for parents and teachers for the entire day during parent-teacher meeting where free nutritional counselling was provided to them by the trained nutritionist. They were given free of cost assessment of their body mass index, blood pressure and blood glucose by a physician. In addition, the parents of intervention children were telephonically contacted every month and were asked a set of standard questions pertaining to diet, lifestyle and PA of the child. Parents of each child were counselled for 5–7min every month.
Training of student volunteers to sustain the programme	An additional 1-h session was held every week with 40 student volunteers of eleventh grade. They were given instructions to disseminate the health messages to their peers and juniors. Activities such as skits in the morning assembly on nutrition-related topics such as harmful effects of 'junk' foods, healthy vs unhealthy lifestyle were held twice during the intervention programme. Demonstration of recipes for healthy tiffin was done by them in the morning assembly on the occasion of World Food Day. Instructions were given to them to check and evaluate the tiffins (packed lunch) of junior students each week and to counsel them to bring healthy tiffin each day. The children were given 2 demonstrations of healthy and easy-to-prepare snacks by their teacher as well as the nutritionist. Children were also asked to bring wrappers of foods such as biscuits, fruit juices, chocolates, ice-creams, and so on, and they were made to understand the nutritional and calorie content of these energy-dense food items.



## 5. COMPONENT 3

**The identification of high-risk, underserved, or vulnerable youth sub-groups at risk of developing non-communicable diseases.**

### 5.1. MAIN FINDINGS OF THE LITERATURE REVIEW

In this study, we identified 10 youth sub-groups that we believed would be at risk of developing NCDs. These included pregnant teenagers, youth with obesity, youth in single-parent households, orphaned children living in institutional care, unemployed youth, alcohol or substance dependant youth, youth with HIV, youth with disabilities, youth living with abuse or conflict, and youth living with depression. These were selected by studying the most recent SA national data available.

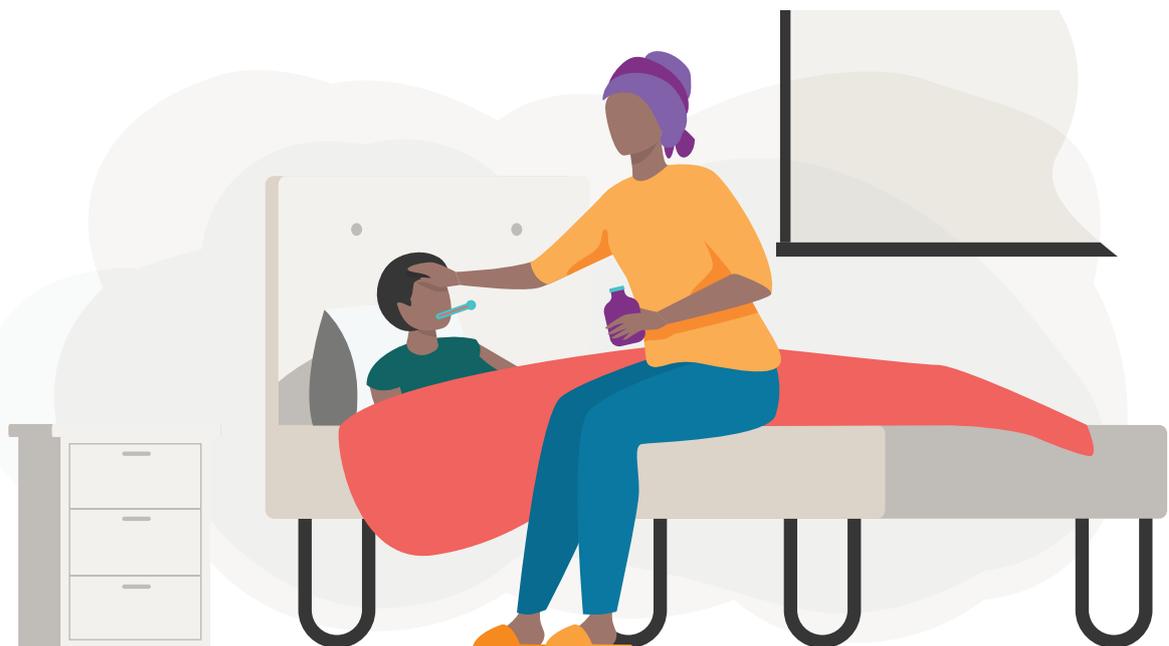
Early childbearing can result in a loss of educational attainment, leading to reduced employment opportunities, which perpetuates the cycle of poverty over multiple generations<sup>84</sup>. According to the YRBS<sup>35</sup>, 18.3 per cent of female adolescents (grades 8-11) have given birth and were parenting a child in SA. The highest prevalence was found in KZN (28.2 per cent).

Overweight and/or obesity was found in 31.3 per cent of 15-to-19-year-old females according to the SADHS<sup>19</sup>, compared to 9.6 per cent of males. In the 20-to-24-year-old group, 60 per cent of females were overweight or obese compared with 14.5 per cent of males. The consequence of a high BMI is an increased risk of developing NCDs in later adulthood.

According to Statistics SA (Stats SA), in 2015 more than 50 per cent of the SA population was living below the Food

Poverty Line, with half of all poor South Africans being women, and 66.8 per cent of children under 17 years old were living in households characterised by poverty. Households led by Black African women were the most affected by impoverishment<sup>85</sup>. Female-headed households in LMICs were forced to fulfil multiple roles as both parent and financial provider. Their employment in marginal, low-income jobs, results in needs for them and their children not being met due to insufficient resources for survival. A major consequence of living in this manner is poor physical and mental health, poor quality of life, and reduced wellbeing of both parent and child, resulting in increased susceptibility towards NCDs<sup>6</sup>. According to the SADHS<sup>19</sup>, between 30.2 per cent and 40.2 per cent of households were female-headed. Studies have highlighted that youth living in female-headed households were more likely to develop unhealthy eating habits in comparison with dual-headed households<sup>86</sup>. These habits include fewer family meals eaten together<sup>87</sup>, skipping of meals<sup>88</sup>, reduced intake of fruit and vegetables<sup>87,89</sup>, increased intake of SSBs<sup>90</sup>, and fast food consumption<sup>91</sup>.

Children who enter into an alternative-care setting (foster care or institutional) in their first few years of life are at a high risk of stunted physical growth. Height, weight, and head circumference may be affected, impacting their future health in adolescence. Their neuroendocrine systems also become dysregulated<sup>92</sup>. One of the main reasons for stunted growth among institutionalised children is undernutrition, with micro- and macronutrient deficiencies being a major factor<sup>93</sup>.



Adolescents living with chronic illnesses, such as TB, HIV, diabetes mellitus, or epilepsy require additional attention when accessing health care services in facilities, particularly with transitions in health care. Adolescents and youth may also be placed in vulnerable situations when they leave State care facilities without the necessary bridging and guidance programmes to ensure a safe transition<sup>94</sup>.

According to Stats SA, an increase was found in orphanhood among children aged 0-to-17-years in SA between 1996 and 2011. Additionally, the highest percentage of youth who have lost one or both parents in SA was found in KZN province (30 per cent)<sup>95</sup>.

Unemployment is directly related to poverty, which correlates with poor nutrition and health. Numerous problems associated with poor diet and lack of PA can contribute to developing NCDs in later adult life. Unemployment is associated with sickness, disability, mental health problems, cognitive disorders, fear, distress, substance use, addiction and alcoholism, and even suicide<sup>96</sup>. In a cycle of unemployment, physical or mental illness limits employment, which further exacerbates illness and places strain on State health care systems<sup>96</sup>. Youth unemployment and its effects on poverty trickle into the family and perpetuates the generational cycle of impoverishment.

According to the SADHS (2016)<sup>83</sup>, in the 15-to-19-year-old group 92.8 per cent of males and 96.6 per cent of females had not been employed in the past 12 months. This decreased to 58.5 per cent in 20-to-24-year-olds males and 75.5 per cent in females.

Substance and alcohol use during adolescence has been associated with disordered eating patterns and unhealthy weight loss practices, such as fasting and the use of diet pills and laxatives<sup>97-99</sup>. Youth engaging in disordered eating risk severe health and psychological consequences such as electrolyte imbalance, poor nutrition, impaired psychosocial development, body image difficulties, and even premature death<sup>98</sup>. Additionally, alcohol and substance use among youth reduces engagement in PA, resulting in poor nutrition and meal skipping.

According to the YRBS, binge drinking of alcohol among youth is as high as 30 per cent in some age categories, compared with WHO global figures of 13.6 per cent (ages 15-to-19-years) and 21.8 per cent (20-to-24-years)<sup>35,100</sup>. In SA, the YRBS found that binge drinking was 17.2 per cent in under 13-year-olds, 21.3 per cent in 14-to-16-year-olds, and 29.9 per cent in 17-to-18-year-olds<sup>35</sup>.

Living with an HIV infection is strongly linked with malnutrition, wasting, and stunting in youth even with some improvement noted after the introduction of the highly active antiretroviral therapy (HAART) in the nineties<sup>101</sup>. However, the use of HAART among youth has been associated with metabolic alterations involving hyperglycaemia and dyslipidaemia, as well as abnormalities in body fat distribution<sup>26</sup>. Youth living with HIV on HAART treatment may have additional comorbidities of endocrine alterations such as adrenal failure, thyroid alterations, lipodystrophy,

insulin resistance, and alterations in the growth hormone axis<sup>102</sup>. Growth retardation, a major issue among HIV infected children, is multifactorial and leads to inadequate energy intake, increased energy expenditure and catabolism, HIV enteropathy, gastrointestinal infestations, and persistent chronic inflammation<sup>102</sup>. Alterations of this nature are known to have severe consequences, impacting the long-term health of HIV-infected youth through an increased risk of developing cardiovascular disease, kidney diseases, liver diseases, and osteopenia/osteoporosis in adulthood<sup>103</sup>.

Data from the South African National HIV Prevalence, Incidence, Behaviour and Communication Survey conducted in 2017<sup>104</sup> showed that females aged 20-to-24-years are at the highest risk of contracting HIV according to the prevalence and incidence results.

Youth living with a disability face many issues such as isolation, exclusion, abuse, and reduced education and employment opportunities<sup>105</sup>. As a result, they are confronted with multidimensional levels of poverty, which severely impacts the living circumstances of the household.

Families living with a child with disabilities generally have lower incomes and are at a significantly higher risk of falling below the poverty line since at least one parent (usually the mother) must give up employment to take on a caregiving role. With a single, female-headed household this will have dire consequences and will impact the physical, social and emotional health of the child. In many cases, youth with disabilities end up being placed in institutionalised care facilities as the family are unable to cope or have limited resources and finances<sup>95</sup>. Youth with disabilities may suffer from low self-esteem, psychopathology, social exclusion, alcohol and substance use, and have difficulty transitioning from adolescence into adulthood and finding employment. This all results in living below the poverty line and therefore susceptibility to future NCD development<sup>106</sup>. According to the YRBS in SA, Limpopo province had the highest percentage (24.6 per cent) of youth with disabilities<sup>35</sup>.

Maltreatment and abuse towards youth results in severe physical and psychological problems that usually persist into adulthood. These health consequences include injuries, psychopathology, increased risk of HIV contraction, and poor health behaviours relating to nutrition and obesity<sup>107</sup>. Youth living under these conditions of abuse are at a greater risk of engaging in risky sexual activities and alcohol and substance abuse, which in turn reduce the likelihood of succeeding at school or work and maintaining healthy relationships. Females are more likely to experience abuse, neglect, and bullying whereas males are more prone to experiencing various forms of violence<sup>108</sup>. The results of the Optimus Study conducted in SA on child abuse, violence and neglect, revealed that by the ages of 15-to-17-years many young people have been exposed to some level of sexual, physical or emotional abuse, neglect, or high rates of violence<sup>108</sup>.

Adequate nutrition and regular PA are vital for a growing child's physical and mental health, cognitive development, brain maturation, and general wellbeing. However, the quality of young people's diets has significantly deteriorated

over time with ample research showing the important role of nutrition in the development or progression of adolescent depressive symptoms<sup>109</sup>. Studies have shown that eating a healthy diet is significantly associated with better emotional health while poor nutrition is significantly associated with greater emotional distress<sup>110-112</sup>.

Research conducted on Australian adolescents highlighted that those who consumed a healthy diet were less likely to report depressive symptoms in comparison to those who ate processed 'junk' foods. The latter were more likely to report symptoms of depression<sup>113</sup>.

Youth living with depression are also at risk for engaging in alcohol and substance use, reduced PA, and decreased success in school and work activities.

Furthermore, they are at an increased risk of attempting suicide and death, which is highlighted in the YRBS<sup>35</sup>. In the suicide attempt requiring medical treatment category, ages 14-to-18 years demonstrate high percentages. At this age, peak adolescence, teens are at high risk of developing mental health problems.



## 5.2. KEY MESSAGES

- Overweight and obesity are risk factors for developing many NCD conditions including hypertension, type 2 diabetes, and heart disease. The DoH and the DoBE are advised to target the age group 10-to-19-years in terms of the health services provided (ISHP) and health promotion at schools.
- All females in this age group should be nutritionally assessed on a regular basis. Overweight children having a BMI  $\geq 25$  Kgm<sup>2</sup> should be a focus for both school nurses and teachers of LO.
- The LO curriculum needs to be evaluated by an independent nutrition, PA, and public health specialist regarding its focus on diet and PA and its content relating to overweight and obesity prevention.
- It is very important that schools have a policy that promotes healthy eating and sufficient PA for learners.
- The targeting of adolescent females could be initiated at schools in quintiles 1-3 to begin with since these schools will have many children who were stunted at an earlier age, making them more susceptible to developing overweight and obesity and consequently NCDs.
- All the vulnerable groups mentioned in this report could be reached by other means such as bans on advertising unhealthy foods and drinks on radio, television, and social media, and some of the policies already in place such as the sugar levy, trans-fat regulations, and the reduction of salt in many foods purchased.



## 6. COMPONENT 4

**The identification of gaps in modifiable non-communicable disease risk factors with specific reference to dietary intake practices and physical activity habits amongst youth using focus group discussions and loGT polls.**

### 6.1. FOCUS GROUP DISCUSSIONS

#### 6.1.1. METHODOLOGY

This section of the report draws on qualitative data collected via the use of 14 FGDs from 4 diverse provinces in SA. These provinces (Western Cape, Eastern Cape, Gauteng, and Limpopo) were chosen according to sites within the province consisting of cities, towns, and villages within urban and rural settings according to SES.

Inclusion criteria for the study were divided into 3 age categories of boys and girls from the 4 chosen settings. These age categories were selected to distinguish between younger and older youth to allow for comparisons between them according to their diet, PA knowledge, and beliefs. Ages 10-to-14-years was categorised as early adolescence, ages 15-to-19-years as adolescence, and ages 20-to-24-years as young adults.

A convenience sampling method was used to select the young participants from the 4 provinces and sites within. Facilitators entered the communities and connected with community leaders and known contacts in the area. Recruitment letters that outlined the purpose and details of the study were provided. These contacts and community leaders helped field workers to source participants according to each age category. When enough participants were sourced, a time and place were set for the focus group to be conducted.

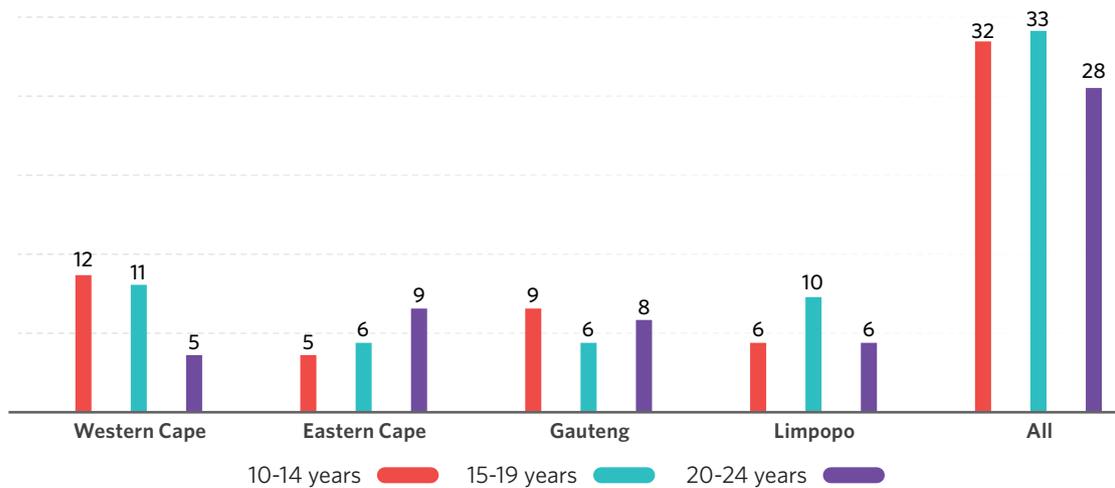
The development of the schedule was carried out by 3 researchers based on previous analysis and the gaps relating to knowledge and beliefs of youth regarding diet and PA. The programme, consisting of 17 questions, was reviewed in an iterative manner between the researchers until the final schedule was devised. The aim of the FGDs was to obtain insights arising from discussions with participants relating to knowledge and beliefs on diet and PA.

Each FGD included 5-10 participants and lasted from 40-90 minutes depending on the size of the group and the age category. The FGDs were held in a private venue and were chosen by the facilitator and a community contact. Due to the current COVID-19 pandemic, masks, social distancing, and sanitiser were provided to all. Upon arrival, each participant reviewed and signed an informed consent and demographic form in the presence of the facilitator who would assist younger groups when necessary. The 10-to-14-years age group further had to have the informed consent form signed by a parent or guardian. The fieldworkers encouraged participation among the group and used additional questions where necessary to elicit further information. The facilitators made use of recording devices to document all the FGDs.

Thematic analysis was conducted on all the transcripts where codes were developed and the combination of a deductive and inductive approach was used for theme identification<sup>114</sup>. The deductive approach involved determining pre-identified themes that arose from the research questions and were discussed in meetings by the researchers. The inductive approach allowed for emerging themes to arise during the analysis process. A total of 9 themes were identified (Table 4). Discrepancies between emerging themes were discussed and resolved to ensure that the themes reflected the research questions and pre-identified themes.

Transcripts from 14 FGDs with 93 participants from all 3 age categories in the 4 provinces were analysed. Divided by province (Figure 1), Western Cape had 28 participants, Eastern Cape had 20 participants, Gauteng had 23 participants, and Limpopo had 22. Participants were 58 per cent males and 42 per cent females. The majority of the sites were LMI settings with only 2 medium- to high-income settings, one in the Western Cape and one in the Eastern Cape. Figure 1 provides the percentage of participants in each age group.

**FIGURE 1:** Number of FGD participants per age group



6.1.2. SUMMARY OF FINDINGS BY THEMES

**TABLE 3:** Emerging themes for youth that participated in focus group discussions in 4 provinces in SA.

Deductive themes
1. Knowledge of a link between an unhealthy lifestyle in youth and NCD development in adulthood
2. Knowledge about unhealthy dietary habits and foods
3. Influences on diet and PA
4. Source of diet-related information / awareness of food-based dietary guidelines
5. Weight issues among youth
6. Challenges to following a healthy diet
7. Challenges to being physically active
8. Importance of living a healthy lifestyle
9. Youth involvement in healthy changes



### THEME 1

#### Knowledge of a link between an unhealthy lifestyle in youth and NCD development in adulthood

Age category 10-to-14 years in most of the settings were more focused on what they ate and how this impacted them today rather than the future. In the older age groups (15-to-24 years), participants identified 3 NCDs—namely diabetes, high blood pressure, and obesity—as diseases that can develop later in life. Awareness of PA among the participants focused a lot on going to the gym to make one strong and fit, which will result in you living longer. Additionally, many participants commented on a lack of PA due to laziness and obesity/getting fat.



### THEME 2

#### Knowledge about unhealthy dietary habits and foods

Most participants across all sites and age groups had a reasonable knowledge of the difference between healthy and unhealthy foods and habits. Participants had no difficulty in listing foods that they knew to be unhealthy as well as offering healthier options. Common unhealthy dietary habits that came up among the participants were skipping meals, constant eating, a lack of exercise, and not following a balanced diet. The older age groups provided more depth on unhealthy eating habits in comparison to the youngest group and were easily able to list the unhealthy foods. The most listed unhealthy foods by all the groups were takeaways and “junk foods”. Participants were able to list why these were unhealthy due to them being high in sugar and fats. As far as drinks were concerned, SSBs and alcohol were mentioned with an emphasis on water being best.



### THEME 3

#### Influences on diet and physical activity according to the socio-ecological model

Across the groups, the data revealed that friends played a prominent role in influencing one another to take part in PA, with these influences being more common among the younger age groups due to fitting in (acceptance) and peer pressure. Family and school/university influences played the most prominent role across all groups when it came to diet.

Many participants said that they were reliant on their family and did not have a choice about what was provided at meals.

The school environment, across the first 2 age groups, was highlighted by many participants as having tuck shops filled with “junk foods” and, in some cases, participants commented on healthy foods being served for the school lunch whilst others said that it was not always the case. The influence of the community on diet and PA was not agreed upon by many of the participants. The main component that arose was the impact of supermarkets and vendors in the area and on what foods they have available. Regarding PA, safety was a factor and playing soccer in the streets was believed to be a community influence that was problematic and noisy for neighbours.



### THEME 4

#### Source of diet-related information/awareness of food-based dietary guidelines

Societal factors such as the impact of marketing, social media, and peer pressure to look good were raised by participants as being causes of why people may have problems with their weight. Resulting unhealthy outcomes such as taking drugs, wearing slimming belts, or using diet pills were mentioned by some participants.

Most participants across the sites and all age groups had not heard of the FBDGs. In the total population, only 9 participants (10 per cent) stated that they had heard of the FBDGs and were able to comment on it.

Participants ranged in their responses over where they found information on healthy eating. The 4 main resources were from home, school (textbooks, LO lessons, and teachers), television, social media, and the internet.

A sub-theme that arose among a few participants was that there is a general lack of education when it comes to what constitutes a healthy diet and that messages regarding healthy diet and PA are sometimes confusing.



### THEME 5

#### Weight issues among youth

This theme tapped into all groups, with most participants indicating that many young people did have weight issues. Participants agreed that an emotional component such as stress, depression, or a lack of self-esteem was often evident in the development of weight issues. Participants spoke

about young people being overly occupied with going to the gym, especially male participants. It was highlighted that the boys are trying to put on muscle and the girls are all trying to get slimmer, to be better liked.



### THEME 6 Challenges to following a healthy diet

Despite awareness of health consequences, the participants repeatedly spoke about the challenge of how good unhealthy foods taste. This challenge was evident regardless of age group or SES. Participants spoke of not being able to resist these foods, being addicted to them, and completely loving and needing them. Taste was closely tied in with affordability and availability of food, these being other challenges highlighted across all groups to following a healthy diet. Unhealthy foods were described as readily available and cheap in comparison to healthy foods, which many participants stated were challenging to find in their communities. The difficulty of food affordability was also associated with adolescent autonomy. Advertising and social media as barriers to eating a healthy meal were raised by many participants. It was conveyed that friends post their takeaway meals on social media making one crave them even more. The constant adverts on television make it difficult for participants to resist unhealthy meals.



### THEME 7 Challenges to being physically active

In order of importance; social media, watching television, laziness, availability of facilities, and having enough time were all challenges that affected participants being active. Participants highlighted that they spent a lot of time either watching television, browsing the internet or on social media, with some commenting that they were addicted to their phones and did not have the time to partake in PA.

Laziness among the participants came up frequently especially when it involves a busy schedule and not having enough time to be active. Many participants suggested that their friends, and people in general, are lazy, which is why they don't exercise.



### THEME 8 Importance of living a healthy lifestyle

The majority of participants said that living a healthy lifestyle was definitely important to them as this would reduce illness and improve health in the long term. Various methods to achieve this were discussed, such as regular exercise, drinking lots of water, avoiding alcohol and smoking, eating fruit and vegetables, reducing fats, getting enough sleep, and avoiding 'junk foods'. There were no differences across age groups except for increased discussions as the groups got older.

Ways of improving one's lifestyle led to 2 interconnected sub-themes of goal setting and a lack of motivation or self-efficacy in order to achieve these goals. The majority of participants across all groups stated that they had tried to set goals in order to either improve their diet or increase PA. A small number indicated that it was easy and that they had reached their goals. However, in general, the participants noted that setting the goal was not difficult but maintaining it was very challenging. There were various reasons for not maintaining the set goals such as not having enough time, junk foods being too delicious, the cost of healthy foods, and friends and family influencing meals.



### THEME 9 Youth involvement in healthy changes

Participants had a variety of ideas on what they could do to become involved in helping other young people to make healthier changes to their diet and incorporating PA into their lives. There were no major differences noted across the 4 provinces other than the increasing intelligence of ideas among the older age groups. Some of the more prominent ideas that were discussed among the participants included starting diet- and PA-related support groups, more education on the effects of poor diet (with ideas such as creating posters and pamphlets to be given out in communities and at schools), raising awareness through workshops, use of social media, and regular nutrition and PA programmes.

Some participants suggested that instead of implementing running, soccer, or sports groups, which not everybody likes, they could create dance groups in their community as most youth love to dance and this could also help with reducing youth involvement in crime.

### 6.1.3. KEY MESSAGES FROM FOCUS GROUP DISCUSSIONS

- Adolescents in the 10-to-14-year-old group are least aware of the association between a healthy lifestyle and the development of NCDs. These concepts should be included in the LO curriculum from this age onwards or even before, if possible.
- Across the groups, the data revealed that friends played a prominent role in influencing one another to take part in PA, with these influences being more common among the younger age groups due to fitting in and peer pressure. Family and school/university influences played the most prominent role across all groups when it came to diet.
- The influence of the community on diet and PA was not agreed upon by many of the participants. The main components that arose were the impact of supermarkets and vendors in the area and what foods they have available.
- Societal factors, such as the impact of marketing, social media and peer pressure to look good, were mentioned by participants as being one of the reasons people may have problems with their weight.
- Participants agreed that an emotional component was often evident in the development of weight issues such as stress, depression or a lack of self-esteem.
- Most participants across the sites and all age groups had not heard of the FBDGs. In the total population, 9 participants (10 per cent) stated that they had heard of the FBDGs.
- The main dietary health resources were home/family, school (textbooks, LO lessons, and teachers), television, social media and the internet.
- Unhealthy foods were described as readily available and cheap in comparison to healthy food which many participants stated were challenging to find in their communities.
- Advertising and social media were also impediments to healthy eating raised by many participants.
- Regarding PA, safety was a factor and playing soccer in the streets was believed to be a community nuisance that was problematic for neighbours.
- Participants highlighted that they spent a lot of time either watching television, on the internet, or browsing social media, with some commenting that they were addicted to their phones and did not have the time for PA.
- The majority of participants across all groups stated that they had tried to set goals in order to either improve their diet or to increase PA. A small number indicated that it was easy and that they had reached their goals. It was generally suggested that setting the goal was not difficult but maintaining it was very challenging.
- There were various reasons for not maintaining the set goals, such as not having enough time, 'junk' foods being too delicious, the cost of healthy foods, and friends and family influencing meals.
- Some of the more prominent ideas that were discussed among the participants regarding the involvement of youth included starting diet and PA related support groups, more education on the effects of poor diet (with ideas to create posters and pamphlets to be given out in communities and at schools), raising

awareness through workshops, use of social media, and regular nutrition and PA programmes.

- Some participants suggested that instead of starting running, soccer, or sports groups, which not everybody likes, they could create dance groups in their community as most youth love to dance.

## 6.2. INTERNET OF GOOD THINGS (IOGT) POLLS

### 6.2.1. METHODOLOGY

This section of the report draws on cross-sectional data collected via the use of the IOGT polls, which were arranged by UNICEF SA.

Inclusion criteria covered young persons of all gender identities aged 10-to-24 years who have registered with the UNICEF IOGT platform. There were some respondents who participated in this part of the study who were older than 24 years.

The IOGT is a UNICEF-led initiative that aims to bridge the digital divide and build knowledge in societies. Internet of Good Things hosts mobile-packaged content designed to make lifesaving and life-improving information available for free, even on low-end devices. By connecting to IOGT, children, adolescents, mothers, fathers, other family members, health trainers, caregivers, and communities can gain access to localised, updated, quality content at their point of care and directly on their mobile phone at any time for free.

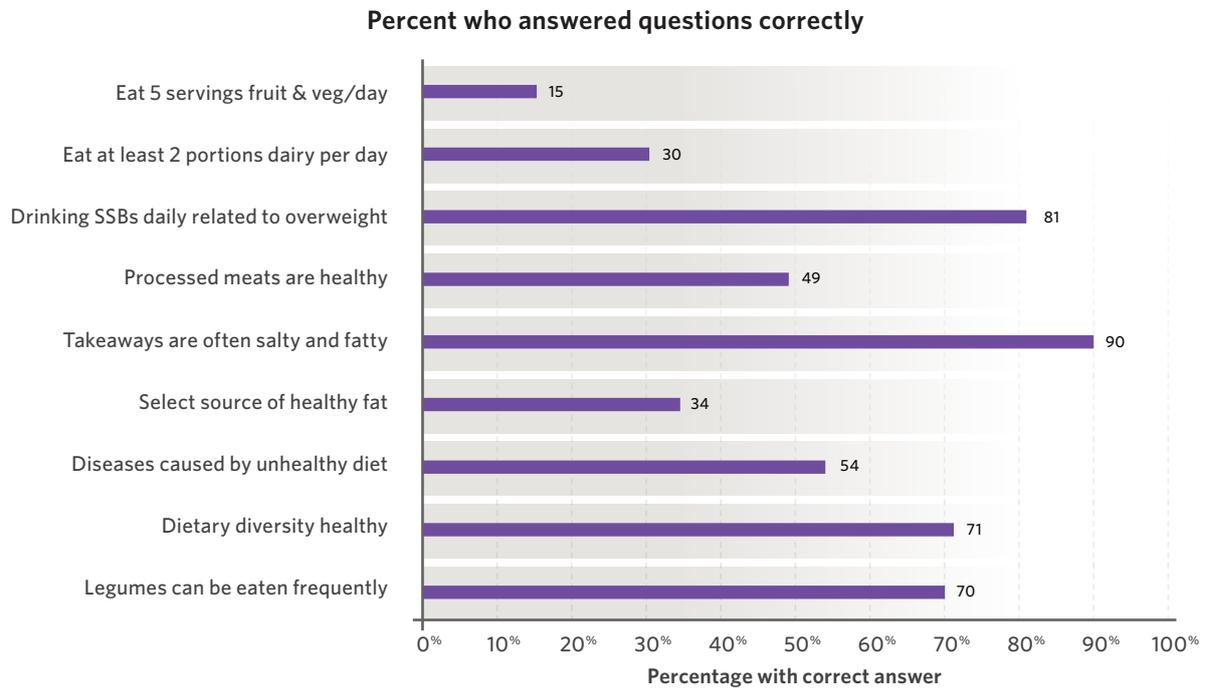
All respondents that participate remain anonymous and take part of their own free will. Three polls were sent out on the IOGT platform during the month of March and April 2021 with a week between each poll. The first poll (n=290) focused on dietary knowledge, the second (N=52) looked at PA knowledge and behaviour, and the third poll (N=92) was based on dietary behaviour. A limitation of the study is the low samples for polls 2 and 3 due to the inability to promote them based on privacy issues that arose from service providers during this time.

### 6.2.2. SUMMARY OF MAIN FINDINGS

#### 6.2.2.1. Dietary knowledge and behaviour questions

Figure 2 presents findings on the dietary knowledge of the participants. Overall, only 15 per cent of the group mentioned requiring 5 or more servings of fruit and vegetables per day, of which 51 per cent were females and 49 per cent were males. 30 per cent mentioned the requirement for milk and 34 per cent indicated that pilchards were a source of healthy fats. However, 81 per cent answered the SSBs question correctly and 90 per cent knew that takeaways frequently contain much fat and salt. Females generally scored better than males on most questions. With a few exceptions, the youngest group generally scored lower than the older groups (data not shown) and only 18 per cent knew that taking SSBs daily could lead to overweight/obesity.

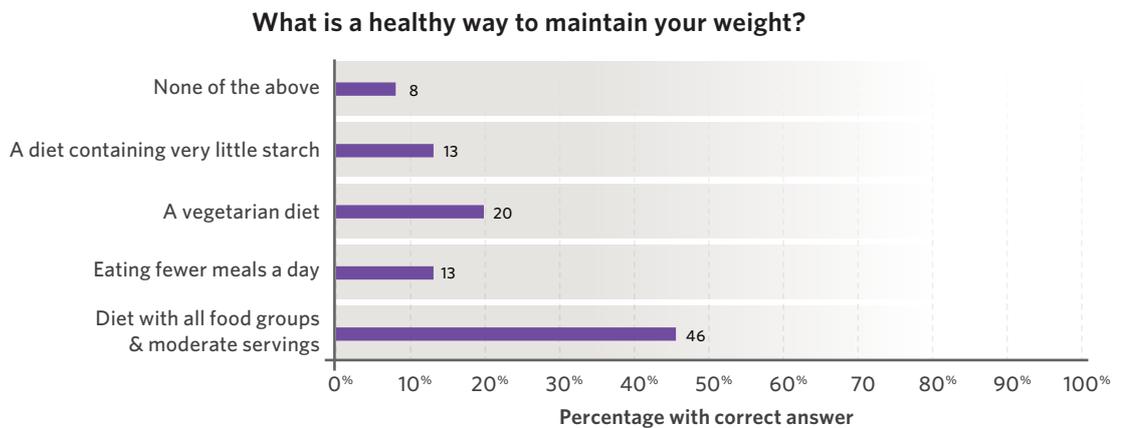
**FIGURE 2.** Correct answers to dietary knowledge questions based on the food-based dietary guidelines (n=290; M=115, F=172)



The participants were asked about the healthiest way to maintain their weight (Figure 3). Only 46 per cent of all participants knew the correct answer, with 62 per cent being females and 37 per cent males.

54 per cent of participants knew the correct answer to which diseases resulted from eating an unhealthy diet. 65 per cent of those were females and 34 per cent were males (Figure 4).

**FIGURE 3:** Answers to the question on maintaining weight (n=290; M=115, F=172)



**FIGURE 4:** Answers to the question about eating an unhealthy diet over a long period (n=290; M=115, F=172)

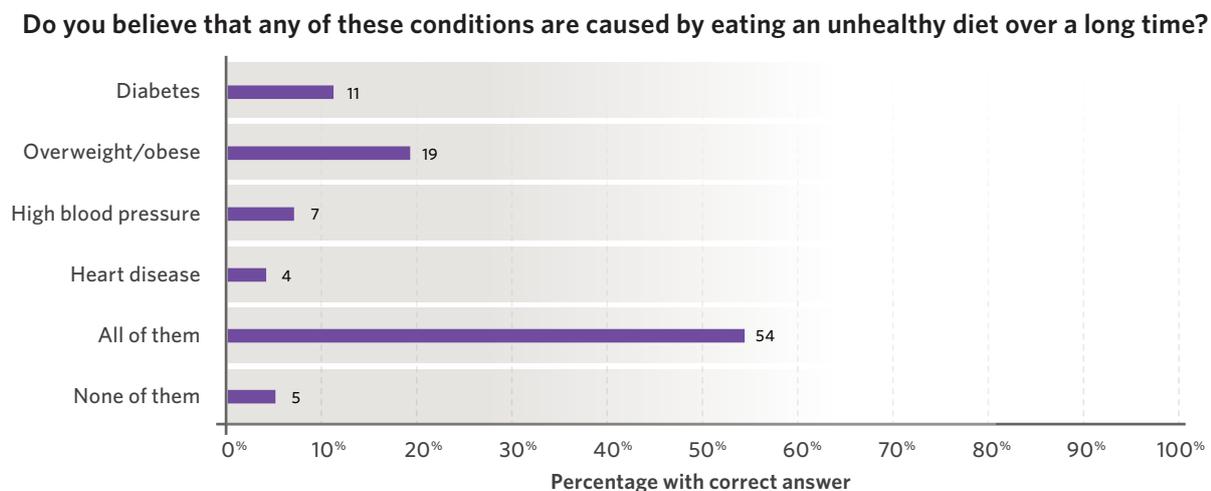


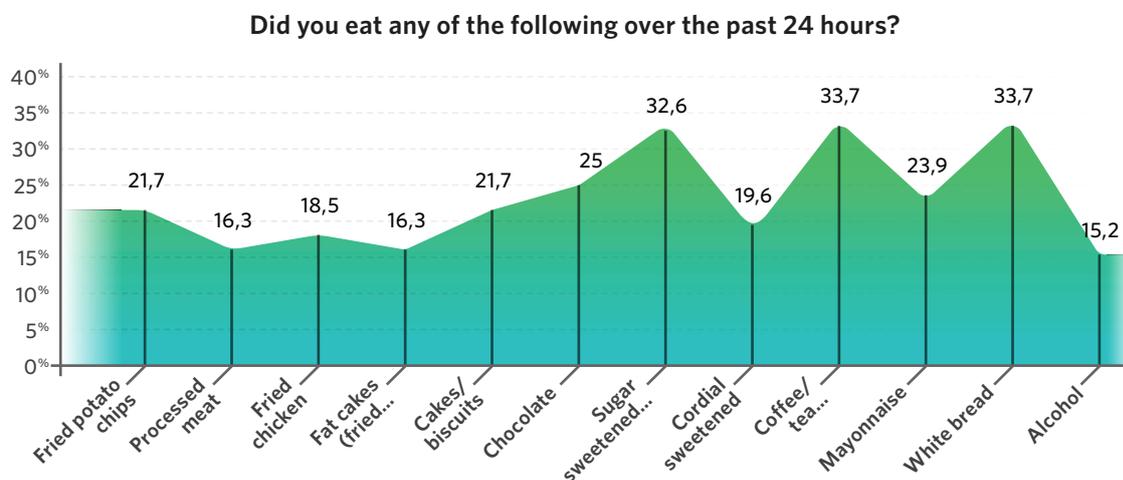
Figure 5 indicates specific high fat and sugary foods eaten by the group (N=92) over the previous 24 hours. Nearly 40 per cent of participants used tea or coffee whitener. Sugar-sweetened beverages and homemade sweetened cold drinks (cordial) were consumed by 32.6 per cent and 19.6 per cent respectively in the previous 24 hours. Fried items, e.g. hot chips (21.7 per cent), fried chicken (18.5 per cent), fat cakes, and processed meats (16.3 per cent) were also common. Sweetened items (cake and biscuits) and chocolates were commonly consumed by 21.7 per cent and 25 per cent, respectively. White bread was eaten by a third of participants and 15.2 per cent had consumed alcohol in the previous 24 hours.

The question on dietary activities over the preceding 7 days is shown in Figure 6. It is disappointing to note that participants only had fruit on a median of 2 days and vegetables on a median of 3 days.

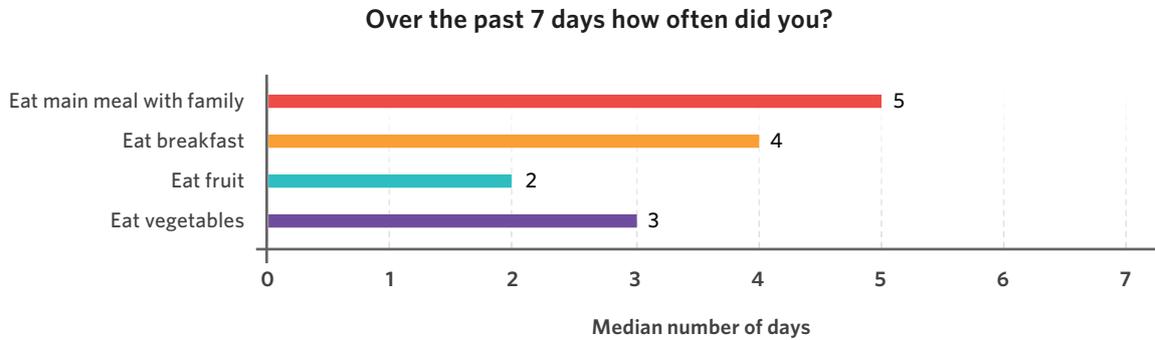
17 per cent of participants purchased takeaways almost daily, with 30 per cent averaging 2-4 days (Figure 7). A large percentage (42 per cent) made their own meals almost daily, while 39 per cent skipped meals on 2-4 days a week.

Family and cost of food played the biggest role in choices of food or drinks, with 44 per cent and 31 per cent respectively (Figure 8).

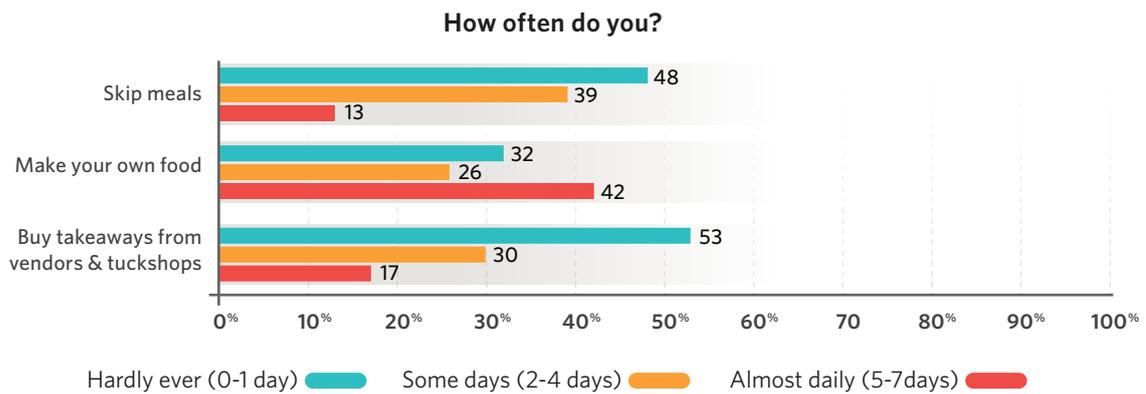
**FIGURE 5:** Specific foods eaten over the past 24 hours (n=92)



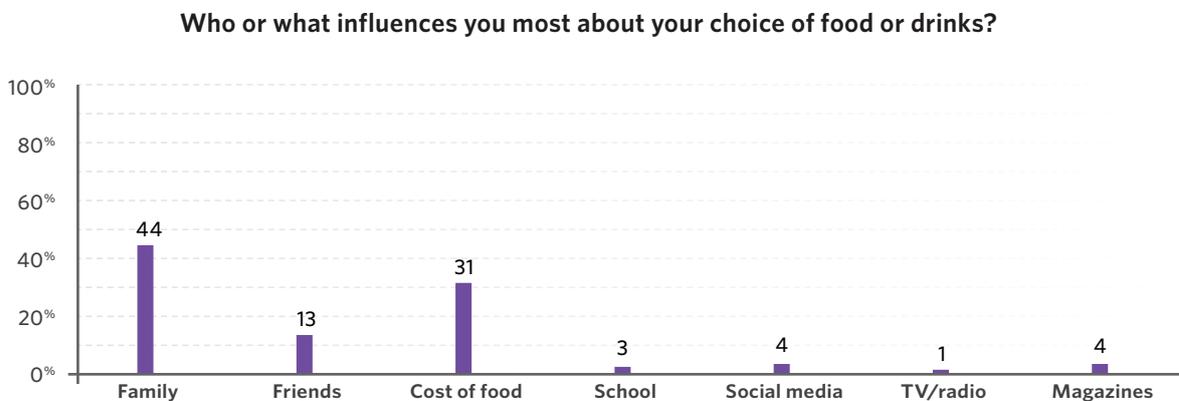
**FIGURE 6:** Answers to questions on dietary behaviour over the last 7 days (N=92)



**FIGURE 7:** Answers to questions on dietary behaviour (N=92)



**FIGURE 8:** Who or what influences the food choices of participants (N=92, M=53, F= 34)



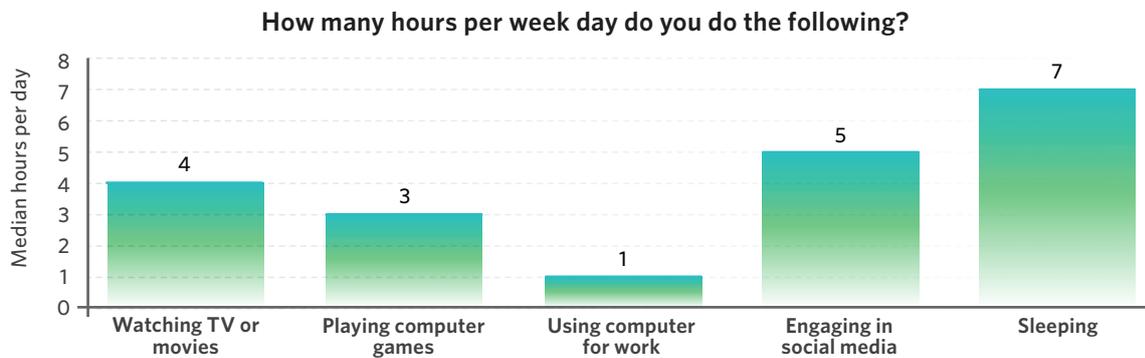
### 6.2.2.2. Physical activity results

Figure 9 indicates that the most time (median 5 hours) is spent engaging with social media, followed by screen entertainment (median 4 hours,) and playing games (median 3 hours). It appears that only one hour is spent on using a computer to do work.

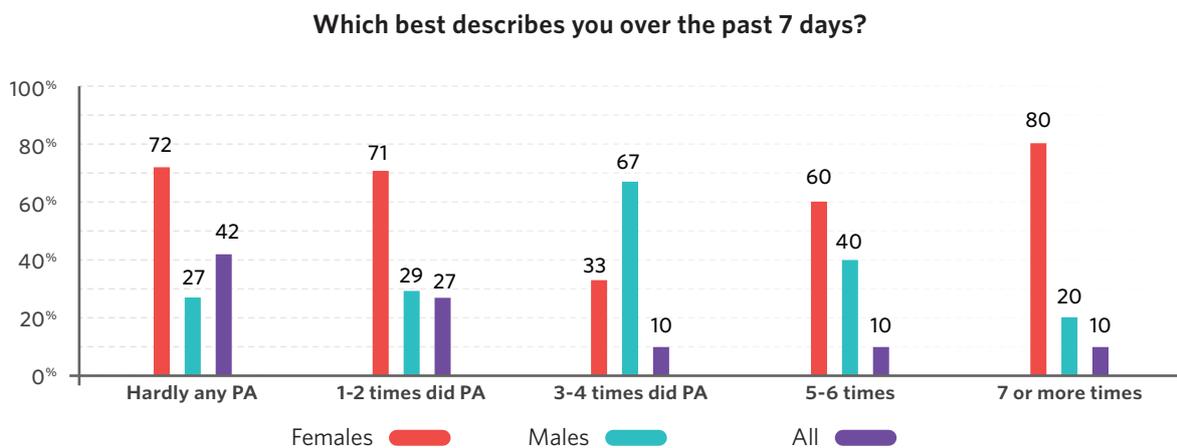
In the previous 7 days, 42 per cent of participants had done very little activity, of which 72 per cent were females and 27 per cent were males, and only 10 per cent had been active frequently (Figure 10).

Only 19 per cent knew that at least 7 hours of moderate to high intensity PA was required, of which 76 per cent were females and 24 per cent were males (figure 11).

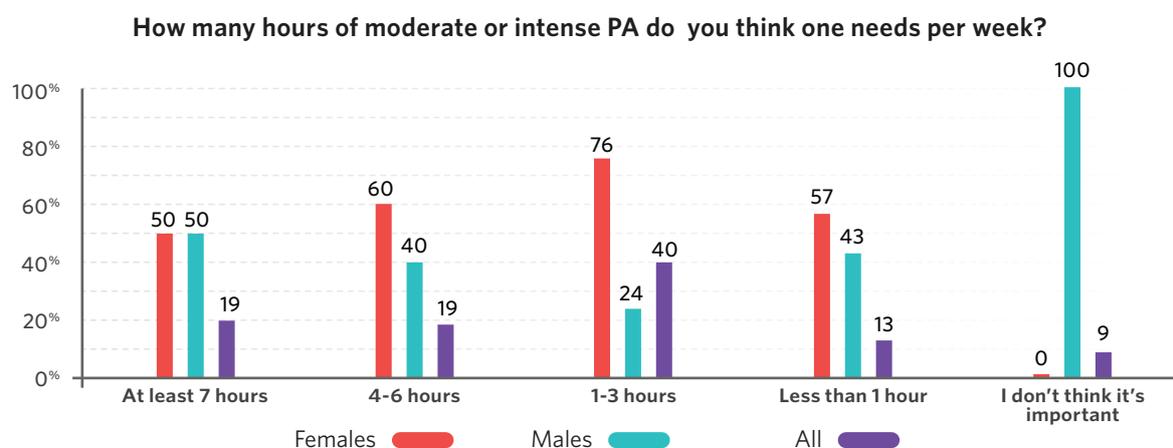
**FIGURE 9: Median hours spent a week on diverse activities (N=52)**



**FIGURE 10: Amount of time participants spent on PA over the past 7 days (N=52)**

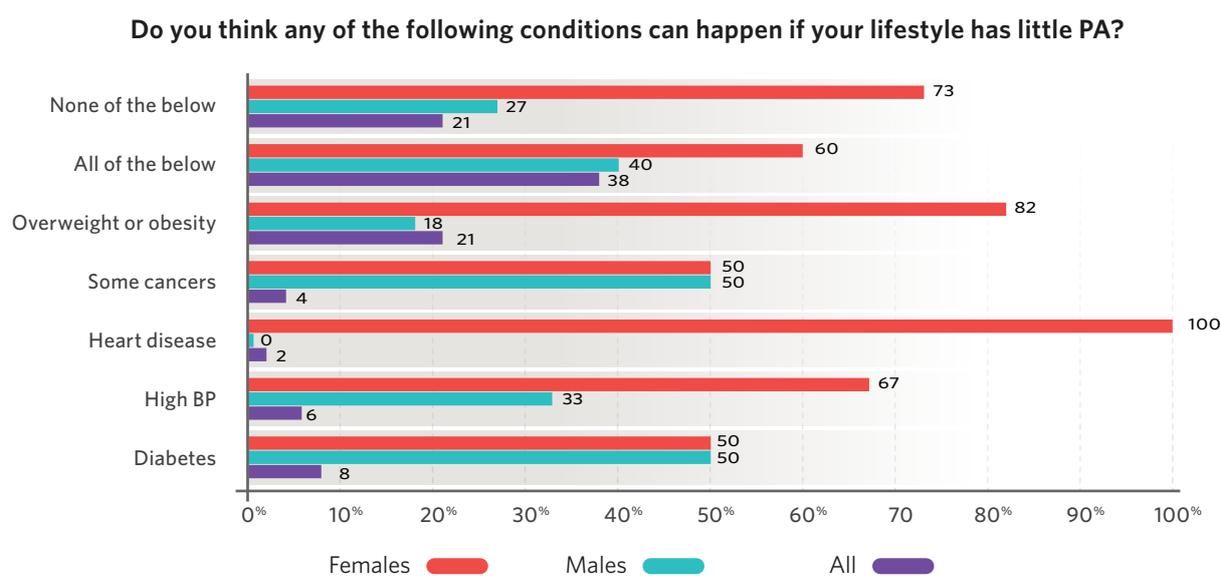


**FIGURE 11: Knowledge of PA requirements (n=52)**



When asked about a healthy lifestyle and PA, 38 per cent provided the correct answer (all of the below), of which 40 per cent were males and 60 per cent were females (n=52) (Figure 12). The results relating to PA need to be interpreted cautiously as the sample size is very small (Figure 12).

**FIGURE 12: Effects of PA on lifestyle and diseases (n=52)**



### 6.3. KEY MESSAGES ON IOGT FINDINGS

The IOGT poll findings revealed gaps in youth knowledge and behaviour around diet and PA. Emphasis should be placed on the following critical areas when implementing behaviour change communication initiatives:

#### 6.3.1. DIET KNOWLEDGE AND BEHAVIOUR

- » Improve dietary knowledge and behaviour among youth by increasing nutrition content within the curriculum.
- » Ensure only healthy food and beverage options are available at schools.
- » Ensure that all adolescents and youth know the FBDGs.
- » Ensure that all youth know about the association between a healthy diet and NCDs.

#### 6.3.2. PHYSICAL ACTIVITY

- » Improve knowledge of PA in the curriculum.
- » Improve PE activities in the school curriculum.
- » Monitor whether PE activities are being carried out in accordance with the guidelines.
- » Consider innovative ways to get youth to be physically active.
- » Involve parents in working to reduce the screen time of youth.
- » Consider the introduction of dance groups at schools.



## 7. COMPONENT 5

**To map the perceptions and experiences of key stakeholders regarding the prevention of non-communicable diseases in adolescents and youth.**

### 7.1. METHODOLOGY

The aim of this study was to collect qualitative data with the intention of mapping the perceptions and experiences of key stakeholders about the prevention of NCDs in adolescents and youth. This was achieved by conducting interviews with key parties within various health and educational organisations in SA.

Informal interviews were held with partners from various sections within the DoH, the NYDA, the DBE, and the WHO. The stakeholders were recommended by UNICEF. The interviews were conducted via Zoom or, in cases where connectivity issues were present, respondents requested to answer the questions in a written format. Interviews were conducted during the month of February 2021.

A schedule of questions was developed by 3 researchers and sent to the stakeholders before the meeting. The questions related to their working experience with adolescents and youth regarding the prevention of NCDs.

The meetings were recorded and transcribed, and key responses have been reported.

### 7.2. FINDINGS

#### **Key findings from stakeholders**

The key findings are summarised below. For detailed information, Annexure A contains a comprehensive summary of the stakeholder responses.

#### **Summary of findings regarding diet:**

- Advocating for health-promoting schools is critical to creating a healthy environment that leads to a decrease in obesity cases.
- Revising the LS and LO curriculum on nutrition and PA is important as most of the stakeholders were unsure of what was included in the LO curriculum.
- There is a need to improve foods and drinks sold at schools so that only healthy options are made available.
- Regulations are required around marketing and advertising of unhealthy foods across all media.
- The contribution of peer pressure, which may encourage poor eating amongst young people, should be addressed as part of the curriculum.
- Poor knowledge of nutrition leads to a lack of portion control. This is an important aspect that needs to be addressed in the LO curriculum.

#### **Summary of findings regarding PA:**

- Learners need the space to be physically active at schools since their safety outside the schools can be compromised.
- Young people spend too much time on screens and browsing social media, which hinder PA.
- There is a need to work with the Department of Social Development and Sport, Arts and Culture to promote PA.
- There is a lack of knowledge regarding the importance of PA and a healthy lifestyle.

## 8. KEY SUMMARY RECOMMENDATIONS

**This section includes key recommendations for the entire study consisting of all 5 components. It is essential for the future health of the population that the DBE and DoH make these decisions at the highest level, including ministerial.**

- » It is recommended that all of the current programmes and initiatives aimed at preventing poor diet and PA among adolescents/youth should be mapped. This should include information as to who is responsible for each of the programmes, who is supporting the programmes (and in which way), and the resource allocation. This will help identify gaps, duplication, and resource needs, to name a few examples.
- » Adolescent/youth health requires renewing the existing commitments across government departments to work towards improving youth health and for new commitments to be put in place where these do not exist.
- » The issues cited as key barriers to adolescents/youth not following a healthy diet and being physically active need further investigation to validate what the key issues are, and to determine which of the barriers need to be focused on first. There is also an opportunity to explore the links between barriers at the different levels of the SEM to determine how these influence one another and how interventions can address these in parallel.
- » There were differing opinions about the programmes run by the DBE. Previously, evaluations were carried out to assess the ISHP and the NSNP as examples of where this approach needs to be extended to all of the programmes run by the DBE. These should be looked at through an adolescent lens on diet and PA for an independent evaluation with clear recommendations that will enable DBE and DoH to implement appropriate corrective actions.
- » It is recommended that an independent nutrition, PA, and education specialist (public health) should review the contents of the nutrition and PE/PA components of the LS/LO curriculum. The curriculum needs to introduce the topic of NCDs and cover their causes and risks. The depth and complexity of this education should increase as the students move into higher grades. Sufficient time needs to be provided for the different components of the LS/LO curriculum and extra time needs to be allocated to nutrition if this is insufficient at present. It was indicated that this currently receives a lower time allocation than the other components of the subject.
- » The Nutrition Directorate has evidence-based FBDGs and materials that have been widely tested in communities and should be included in the LS/LO curriculum instead of the food groups.
- » Access to the LS/LO curriculum needs to be available, clear, and concise for research purposes and for parents of learners who wish to know about the curriculum. The DBE website needs to be updated, making these components available.
- » Several resource constraints need to be addressed to allow for the effective implementation of programmes. It is recommended that those mentioned in these interviews should be investigated in more detail and prioritised. The mapping of resources across government departments could also assist in identifying untapped opportunities to pool assets and find solutions.
- » Dedicated funding for prevention interventions, as well as monitoring and evaluation of these interventions, is required. The YRBS was mentioned as a useful tool for monitoring.
- » It is recommended that communication and collaboration between the government departments interviewed are improved so that there is greater support for the implementation of programmes and challenges can be addressed together.
- » It is recommended that the FBDGs form the basis of the nutrition messages aimed at adolescents/youth and are tailored and packaged in a way that is applicable to them specifically. Please see Component 1 for recommendations in this regard.
- » It is recommended that any PA messages for adolescents and youth are based on the latest WHO guidelines published in 2020, and that updated PA guidelines are introduced in SA. Please see Component 1 for recommendations in this regard.
- » It is recommended that PE be re-introduced as a standalone compulsory subject. The re-skilling of teachers to deliver PE and the availability of resources that are a requisite for PE need to be implemented.
- » The LS/LO nutrition and PA components should also be taught as a single discipline together with NCDs and lifestyle health at teaching colleges and universities.
- » A review of the best communication platforms (taking into consideration reach, the ability for frequent, evidence-based communication, cost, and other applicable factors) to reach the youth with appropriate diet and PA-related messaging needs to be conducted. The platforms mentioned as part of this report should be incorporated in this review. This includes the use of social media and appropriate advertising to youth. Policies aimed at restricting unhealthy food advertising aimed at

adolescents through various mediums, including digital media, should be implemented.

- » A review of youth-led initiatives aimed at improving the diet and PA levels of adolescents/youth revealed that youth-led initiatives were likely to bring more changes. There is an opportunity for adolescents and youth to lead initiatives that are focused on improving the health of their peers. Learnings from research conducted in India and other countries with best practices could form the basis for developing pilot intervention(s) that are specific to the South African context.
- » The DBE, together with other stakeholders, should create an enabling environment for the policy, The Blueprint for Improving the South African School Food Environment, which aims to comprehensively improve the school food domain in SA, is recommended.
- » DBE should implement tighter restrictions to regulate tuckshops, food vendors, and advertising of unhealthy foods in school premises by food manufacturers.

## 9. REFERENCES

1. WORLD HEALTH ORGANISATION. *Definition of adolescence [Internet]*. Adolescent health. 2020 [cited 2020 Oct 19]. Available from: <https://www.who.int/westernpacific/health-topics/adolescent-health>
2. SAWYER SM, AFIFI RA, BEARINGER LH, BLAKEMORE S-J, DICK B, EZEH AC, et al. *Adolescence: a foundation for future health*. The Lancet. 2012 Apr 28;379(9826):1630–40.
3. MAHERY, P, PROUDLOCK, P second. *Legal guide to age thresholds for children and young people [Internet]*. Children's Institute, University of Cape Town; 2011 [cited 2020 Oct 19]. Available from: [http://www.ci.uct.ac.za/sites/default/files/image\\_tool/images/367/Law\\_reform/Children\\_Act\\_guides/Ages%20Guide%20April%202011%20print%20version.pdf](http://www.ci.uct.ac.za/sites/default/files/image_tool/images/367/Law_reform/Children_Act_guides/Ages%20Guide%20April%202011%20print%20version.pdf)
4. UNITED NATIONS. Definition of youth [Internet]. 2019 [cited 2020 Oct 19]. Available from: <https://www.un.org/en/sections/issues-depth/youth-0/>
5. MICHA R, SHULKIN ML, PENALVO JL, KHATIBZADEH S, SINGH GM, RAO M, et al. Etiologic effects and optimal intakes of foods and nutrients for risk of cardiovascular diseases and diabetes: Systematic reviews and meta-analyses from the Nutrition and Chronic Diseases Expert Group (NutriCoDE) [Internet]. PLOS One; 2017 [cited 2020 Oct 20]. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0175149>
6. WILLETT WC, STAMPFER MJ. Current Evidence on Healthy Eating. Annu Rev Public Health. 2013 Mar 18;34(1):77–95.
7. CLINTON SK, GIOVANNUCCI EL, HURSTING SD. The World Cancer Research Fund/American Institute for Cancer Research Third Expert Report on Diet, Nutrition, Physical Activity, and Cancer: Impact and Future Directions. J Nutr. 2020 Apr 1;150(4):663–71.
8. GBD DIET 2017 COLLABORATORS. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2019 May 11;393(10184):1958–72.
9. LEE I-M, SHIROMA EJ, LOBELO F, PUSKA P, BLAIR SN, KATZMARZYK PT, et al. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet. 2012 Jul 21;380(9838):219–29.
10. WROTTESLEY SV, PEDRO TM, FALL CH, NORRIS SA. A review of adolescent nutrition in South Africa: transforming adolescent lives through nutrition initiative. South African Journal of Clinical Nutrition. 2019 Jun 4;0(0):1–39.
11. VORSTER HH, BADHAM JB, VENTER CS. An introduction to the revised food-based dietary guidelines for South Africa. South African Journal of Clinical Nutrition. 2013 Nov 29;26:S5–12.
12. Draper CE, Tomaz SA, Bassett SH, Burnett C, Christie CJ, Cozett C, et al. Results from South Africa's 2018 Report Card on Physical Activity for Children and Youth. Journal of Physical Activity and Health. 2018 Jan 2;15(s2):S406–8.
13. DEPARTMENT OF HEALTH SOUTH AFRICA D OF BESA. Integrated School Health Policy 2012.pdf [Internet]. 2012 [cited 2021 Jan 14]. Available from: <https://serve.mg.co.za/content/documents/2017/06/14/integratedschool-healthpolicybeanddoh.pdf>
14. DEPARTMENT OF BASIC EDUCATION. Department of Basic Education's National School Nutrition Programme [Internet]. [cited 2021 Jan 14]. Available from: <https://www.education.gov.za/Programmes/NationalSchool-NutritionProgramme.aspx>
15. DEPARTMENT OF HEALTH SOUTH AFRICA. National Adolescent & Youth Health Policy 2017 [Internet]. 2017 [cited 2021 Jan 14]. Available from: <https://www.saferspaces.org.za/resources/entry/national-adolescent-youth-health-policy-2017>
16. DEPARTMENT OF BASIC EDUCATION. Curriculum and assessment policy statement, grades 7-9 - Life orientation [senior phase [Internet]. Pretoria: Dep. of Basic Education; 2011 [cited 2021 Mar 19]. Available from: [http://curricula-depot.gei.de/bitstream/handle/11163/1357/779994086\\_2011\\_A.pdf?sequence=2](http://curricula-depot.gei.de/bitstream/handle/11163/1357/779994086_2011_A.pdf?sequence=2)
17. FRANTZ JM. A peer-led approach to promoting health education in schools: The views of peers. South African Journal of Education [Internet]. 2015 Mar 4 [cited 2020 Oct 13];35(1). Available from: <https://www.ajol.info/index.php/saje/article/view/113809>
18. BASSI S, GUPTA VK, CHOPRA I, RANJANI H, SALIGRAM N, ARORA M. Novel school-based health intervention program—A step toward early diabetes prevention. International Journal of Diabetes in Developing Countries. 2015;35(4):460–8.
19. ADMINISTRATOR. South Africa Demographic and Health Survey 2016 [Internet]. South African Medical Research Council. 2019 [cited 2021 May 2]. Available from: <https://www.samrc.ac.za/reports/sadhs2016>
20. MCLEROY KR, BIBEAU D, STECKLER A, GLANZ K. An ecological perspective on health promotion programs. Health Educ Q. 1988;15(4):351–77.

21. KUPKA R, SIEKMANS K, BEAL T. The diets of children: Overview of available data for children and adolescents. *Global Food Security*. 2020 Dec 1;27:100442.
22. WORLD HEALTH ORGANISATION. WHO Global Strategy on Diet Physical Activity and Health [Internet]. 2004 [cited 2020 Oct 27]. Available from: [https://www.who.int/dietphysicalactivity/strategy/eb11344/strategy\\_english\\_web.pdf](https://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf)
23. OKEYO AP, SEEKOE E, DE VILLIERS A, FABER M, NEL JH, STEYN NP. Dietary Practices and Adolescent Obesity in Secondary School Learners at Disadvantaged Schools in South Africa: Urban-Rural and Gender Differences. *Int J Environ Res Public Health*. 2020 13;17(16).
24. OKEYO AP, SEEKOE E, DE VILLIERS A, FABER M, NEL JH, STEYN NP. The Food and Nutrition Environment at Secondary Schools in the Eastern Cape, South Africa as Reported by Learners. *International Journal of Environmental Research and Public Health*. 2020;17(11):4038.
25. MAFUGU T. Assessment of high school learners' familiarity with nutrition education principles. *Eur J Clin Nutr*. 2020 Aug 14;
26. HARRIS T, MALCZYK S, JAFFER N, STEYN NP. How well are adolescents in the Gouda district of Western Cape meeting the South African food-based dietary guidelines for fat, sugar and sodium? *Journal of Consumer Sciences* [Internet]. 2019 Aug 6 [cited 2020 Nov 19]; Available from: <https://www.ajol.info/index.php/jfec/article/view/188688>
27. YAZDI FEYZABADI V, KESHAVARZ MOHAMMADI N, OMIDVAR N, KARIMI-SHAHANJARINI A, NEDJAT S, RASHIDIAN A. Factors Associated With Unhealthy Snacks Consumption Among Adolescents in Iran's Schools. *Int J Health Policy Manag*. 2017 01;6(9):519-28.
28. MONZANI A, RICOTTI R, CAPUTO M, SOLITO A, ARCHERO F, BELLONE S, et al. A Systematic Review of the Association of Skipping Breakfast with Weight and Cardiometabolic Risk Factors in Children and Adolescents. What Should We Better Investigate in the Future? *Nutrients*. 2019 Feb 13;11(2).
29. SHISANA O, LABADARIOS D, REHLE T, SIMBAYI L, ZUMA K, DHANSAY A, et al. The South African National Health and Nutrition Examination Survey, 2012: SANHANES-1: the health and nutritional status of the nation [Internet]. HSRC Press; 2014 [cited 2020 Nov 19]. Available from: <http://repository.hsrb.ac.za/handle/20.500.11910/2864>
30. PENDERGAST FJ, LIVINGSTONE KM, WORSLEY A, MCNAUGHTON SA. Correlates of meal skipping in young adults: a systematic review. *Int J Behav Nutr Phys Act*. 2016 Dec 1;13(1):125.
31. FINK SK, RACINE EF, MUEFFELMANN RE, DEAN MN, HERMAN-SMITH R. Family meals and diet quality among children and adolescents in North Carolina. *J Nutr Educ Behav*. 2014 Oct;46(5):418-22.
32. TABAK I, JODKOWSKA M, OBLACI SKA A, MIKIEL-KOSTYRA K. [Can family meals protect adolescents from obesity?]. *Med Wieku Rozwoj*. 2012 Dec;16(4):313-21.
33. BRAITHWAITE I, STEWART AW, HANCOX RJ, BEASLEY R, MURPHY R, MITCHELL EA, et al. Fast-food consumption and body mass index in children and adolescents: an international cross-sectional study. *BMJ Open*. 2014 Dec 1;4(12):e005813.
34. BOTHA-RAVYSE C. "Be active!" Revisiting the South African food-based dietary guideline for activity. *South African Journal of Clinical Nutrition*. 2013 Aug 9;26(3):S18-27.
35. REDDY S, JAMES S, SEWPAUL R, SIFUNDA S, ELLAHEBOKUS A, KAMBARAN N, et al. The 3rd South African National Youth Risk Behaviour Survey 2011 [Internet]. Cape Town: South African Medical Research Council; 2013 [cited 2021 Jan 5]. Available from: <https://africacheck.org/wp-content/uploads/2018/10/3rd-Annual-Youth-Risk-Survey-2011.pdf>
36. ROMAN-VIÑAS B, CHAPUT J-P, KATZMARZYK PT, FOGELHOLM M, LAMBERT EV, MAHER C, et al. Proportion of children meeting recommendations for 24-hour movement guidelines and associations with adiposity in a 12-country study. *International Journal of Behavioral Nutrition and Physical Activity*. 2016 Nov 25;13(1):123.
37. BILJON A VAN, MCKUNE AJ, DUBOSE KD, KOLANISI U, SEMPLE SJ. Physical activity levels in urban-based South African learners: A cross-sectional study of 7 348 participants. *South African Medical Journal*. 2018 Feb 1;108(2):126-31.
38. HANSON SK, MUNTHALI RJ, MICKLESFIELD LK, LOBELO F, CUNNINGHAM SA, HARTMAN TJ, et al. Longitudinal patterns of physical activity, sedentary behavior and sleep in urban South African adolescents, Birth-To-Twenty Plus cohort. *BMC Pediatr*. 2019 18;19(1):241.
39. BAUMAN AE, REIS RS, SALLIS JF, WELLS JC, LOOS RJ, MARTIN BW. Correlates of physical activity: why are some people physically active and others not? *The Lancet*. 2012 Jul 21;380(9838):258-71.
40. BAUMAN AE, SALLIS JF, DZEWALTOWSKI DA, OWEN N. Toward a better understanding of the influences on physical activity: The role of determinants, correlates, causal variables, mediators, moderators, and confounders. *American Journal of Preventive Medicine*. 2002 Aug 1;23(2, Supplement 1):5-14.

41. MICKLESFIELD LK, PEDRO TM, KAHN K, KINSMAN J, PETTIFOR JM, TOLLMAN S, et al. Physical activity and sedentary behavior among adolescents in rural South Africa: levels, patterns and correlates. *BMC Public Health*. 2014 Jan 16;14:40.
42. WORLD HEALTH ORGANIZATION 2020 guidelines on physical activity and sedentary behaviour [Internet]. [cited 2021 Jan 12]. Available from: <https://www.ncbi.nlm.nih.gov.ezproxy.uct.ac.za/pmc/articles/PMC7719906/>
43. MUTHURI SK, WACHIRA L-JM, LEBLANC AG, FRANCIS CE, SAMPSON M, ONYWERA VO, et al. Temporal Trends and Correlates of Physical Activity, Sedentary Behaviour, and Physical Fitness among School-Aged Children in Sub-Saharan Africa: A Systematic Review. *International Journal of Environmental Research and Public Health*. 2014 Mar;11(3):3327-59.
44. KUBITZ KA, LANDERS DM, PETRUZZELLO SJ, HAN M. The Effects of Acute and Chronic Exercise on Sleep. *Sports Med*. 1996 Apr 1;21(4):277-91.
45. MICKLESFIELD LK, HANSON SK, LOBELO F, CUNNINGHAM SA, HARTMAN TJ, NORRIS SA, et al. Adolescent physical activity, sedentary behavior and sleep in relation to body composition at age 18 years in urban South Africa, Birth-to-Twenty+ Cohort. *BMC Pediatrics*. 2021 Jan 11;21(1):30.
46. SEDIBE MH, FEELEY AB, VOOREND C, GRIFFITHS PL, DOAK CM, NORRIS SA. Narratives of urban female adolescents in South Africa: dietary and physical activity practices in an obesogenic environment. *South African Journal of Clinical Nutrition*. 2014 Oct 10;27(3):114-9.
47. MOKABANE NN, MASHAO MM, VAN STADEN M, POTGIETER M, POTGIETER A. Low levels of physical activity in female adolescents cause overweight and obesity: are our schools failing our children? *S Afr Med J*. 2014 Aug 27;104(10):665-7.
48. WROTTESLEY SV, BOSIRE E, MUKOMA G, MOTLHATLHEDI M, MABENA G, BARKER M, et al. Age and gender influence healthy eating and physical activity behaviours in South African adolescents and their caregivers: Transforming Adolescent Lives through Nutrition Initiative (TALENT) | Public Health Nutrition | Cambridge Core [Internet]. 2019 [cited 2021 Jan 12]. Available from: <https://www-cambridge-org.ezproxy.uct.ac.za/core/journals/public-health-nutrition/article/age-and-gender-influence-healthy-eating-and-physical-activity-behaviours-in-south-african-adolescents-and-their-caregivers-transforming-adolescent-lives-through-nutrition-initiative-talent/F60EE0271350BDE82FA9B0D0CA6D119F>
49. DRAPER CE, GROBLER L, MICKLESFIELD LK, NORRIS SA. Impact of social norms and social support on diet, physical activity and sedentary behaviour of adolescents: a scoping review. *Child Care Health Dev*. 2015 Sep;41(5):654-67.
50. WORLD HEALTH ORGANISATION. Guideline: Implementing effective actions for improving adolescent nutrition. [Internet]. 2018 [cited 2020 Nov 12]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/260297/9789241513708-eng.pdf>
51. WORLD HEALTH ORGANISATION. WHO | What is a Health Promoting School? [Internet]. World Health Organization. World Health Organization; [cited 2021 Jan 13]. Available from: <http://www.who.int/health-promoting-schools/overview/en/>
52. Every Woman Every Child. The Global Strategy for Women's, Children's and Adolescents' Health (2016-2030) [Internet]. 2015 [cited 2020 Oct 22]. Available from: [http://globalstrategy.everywomaneverychild.org/pdf/EWEC\\_globalstrategyreport\\_200915\\_FINAL\\_WEB.pdf](http://globalstrategy.everywomaneverychild.org/pdf/EWEC_globalstrategyreport_200915_FINAL_WEB.pdf)
53. WORLD HEALTH ORGANISATION. WHO | Reducing consumption of sugar-sweetened beverages to reduce the risk of childhood overweight and obesity [Internet]. WHO e-Library of Evidence for Nutrition Actions (eLENA). World Health Organization; [cited 2021 Jan 13]. Available from: [http://www.who.int/elena/titles/ssbs\\_childhood\\_obesity/en/](http://www.who.int/elena/titles/ssbs_childhood_obesity/en/)
54. WORLD HEALTH ORGANISATION. A Framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children [Internet]. 2012 [cited 2021 Jan 13]. Available from: <https://www.who.int/dietphysicalactivity/MarketingFramework2012.pdf>
55. WORLD HEALTH ORGANISATION. Tackling food marketing to children in a digital world: trans-disciplinary perspectives Children's rights, evidence of impact, methodological challenges, regulatory options and policy implications for the WHO European Region [Internet]. 2016 [cited 2021 Jan 13]. Available from: [https://www.euro.who.int/\\_data/assets/pdf\\_file/0017/322226/Tackling-food-marketing-children-digital-world-trans-disciplinary-perspectives-en.pdf](https://www.euro.who.int/_data/assets/pdf_file/0017/322226/Tackling-food-marketing-children-digital-world-trans-disciplinary-perspectives-en.pdf)
56. UNICEF. UNICEF Nutrition Strategy 2020-2030 [Internet]. 2020 [cited 2021 Apr 30]. Available from: <https://www.unicef.org/media/92031/file/UNICEF%20Nutrition%20Strategy%202020-2030.pdf>
57. WORLD HEALTH ORGANISATION. REPLACE Trans Fats-framework [Internet]. 2019 [cited 2021 Apr 30]. Available from: <https://www.who.int/docs/default-source/replace-transfat/1-replace-framework-updated-june-2019-ke.pdf>
58. DEPARTMENT OF EDUCATION. Department of Education. National curriculum statement: Grades R – 9. Pretoria, South Africa: Government Printers; 2003b.

59. NKWANA HM. The Implementation of the National Food and Nutrition Security Policy in South Africa. 2015;23(4):18.
60. DEPARTMENT OF WOMEN, YOUTH AND PERSONS WITH DISABILITIES SOUTH AFRICA. National Youth Policy Draft 2020-2030 [Internet]. 2020 [cited 2020 Oct 14]. Available from: <http://www.women.gov.za/images/articles/NYPDraft-2030-28-July-2020.pdf>
61. DEPARTMENT OF HEALTH AUSTRALIAN GOVERNMENT. National Action Plan for the Health of Children and Young People 2020-2030 [Internet]. 2019 [cited 2021 Jan 14]. Available from: [https://www1.health.gov.au/internet/main/publishing.nsf/content/4815673E283EC1B-6CA2584000082EA7D/\\$File/FINAL%20National%20Action%20Plan%20for%20the%20Health%20of%20Children%20and%20Young%20People%202020-2030.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/content/4815673E283EC1B-6CA2584000082EA7D/$File/FINAL%20National%20Action%20Plan%20for%20the%20Health%20of%20Children%20and%20Young%20People%202020-2030.pdf)
62. GHANA HEALTH SERVICE. Adolescent Health Service Policy and Strategy 2016-2020 [Internet]. [cited 2021 Jan 14]. Available from: <https://www.afro.who.int/sites/default/files/2017-10/ADOLESCENT%20HEALTH%20SERVICE%20POLICY%20%20AND%20STRATEGY.pdf>
63. FEDERAL MINISTRY OF HEALTH NIGERIA. Nigeria Home Grown School Feeding Strategic Plan 2016-2020 [Internet]. [cited 2021 Jan 14]. Available from: <http://extwprlegs1.fao.org/docs/pdf/nig169078.pdf>
64. WOLRD HEALTH ORGANISATION. Global Reference List of Health Indicators for Adolescents (aged 10-19 years). Technical consultation on indicators of adolescent health WHO, Geneva, Switzerland 30 September - 1 October 2014 [Internet]. 2015 [cited 2021 Jan 13]. Available from: [https://apps.who.int/iris/bitstream/handle/10665/204625/WHO\\_MCA\\_15.3\\_eng.pdf;jsessionid=6949AA3CB-F593BDBE6FOAE3D113B8BEE?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/204625/WHO_MCA_15.3_eng.pdf;jsessionid=6949AA3CB-F593BDBE6FOAE3D113B8BEE?sequence=1)
65. MEHTÄLÄ MAK, SÄÄKSLAHTI AK, INKINEN ME, POSKIPARTA MEH. A socio-ecological approach to physical activity interventions in childcare: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*. 2014;11(1):1-12.
66. SOUTH AFRICAN DEPARTMENT OF HEALTH. B-Wise health at your fingertips [Internet]. B-Wise. 2020 [cited 2020 Nov 12]. Available from: <http://bwisehealth.com/>
67. NAIDOO R, COOPOO Y, LAMBERT EV, DRAPER C. Impact of a primary school-based nutrition and physical activity intervention on learners in KwaZulu-Natal, South Africa: a pilot study. *South African Journal of Sports Medicine*. 2009;21(1).
68. DRAPER CE, DE VILLIERS A, LAMBERT EV, FOURIE J, HILL J, DALAIS L, et al. HealthKick: a nutrition and physical activity intervention for primary schools in low-income settings. *BMC Public Health*. 2010 Jul 6;10(1):398.
69. JEMMOTT III JB, JEMMOTT LS, O'LEARY A, NGWANE Z, ICARD L, BELLAMY S, et al. Cognitive-behavioural health-promotion intervention increases fruit and vegetable consumption and physical activity among South African adolescents: a cluster-randomised controlled trial. *Psychology and Health*. 2011;26(2):167-85.
70. EPTON T, NORMAN P, SHEERAN P, HARRIS PR, WEBB TL, CIRAVEGNA F, et al. A theory-based online health behavior intervention for new university students: study protocol. *BMC public health*. 2013;13(1):1-11.
71. OOSTHUIZEN D, OLDEWAGE-THERON W, NAPIER C. The impact of a nutrition programme on the dietary intake patterns of primary school children. *South African Journal of Clinical Nutrition*. 2011;24(2):75-81.
72. PIENAAR A, SALOME KH, STEYN H, NAUDE D. Change over three years in adolescents' physical activity levels and patterns after a physical activity intervention: PLAY study. *J Sports Med Phys Fitness*. 2012;52(3):300-10.
73. SINGHAL N, MISRA A, SHAH P, GULATI S. Effects of controlled school-based multi-component model of nutrition and lifestyle interventions on behavior modification, anthropometry and metabolic risk profile of urban Asian Indian adolescents in North India. *European journal of clinical nutrition*. 2010;64(4):364-73.
74. KWASNICKA D, DOMBROWSKI SU, WHITE M, SNIEHOTTA F. Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories. *Health psychology review*. 2016;10(3):277-96.
75. RYAN RM, PATRICK H, DECI EL, WILLIAMS GC. Facilitating health behaviour change and its maintenance: Interventions based on self-determination theory. *The European health psychologist*. 2008;10(1):2-5.
76. THISTLETHWAITE JE, DAVIES D, EKEOCHA S, KIDD JM, MACDOUGALL C, MATTHEWS P, et al. The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Medical teacher*. 2012;34(6):e421-44.
77. DARGIE F, HENRY CJ, HAILEMARIAM H, REGASSA N. A Peer-Led Pulse-based Nutrition Education Intervention Improved School-Aged Children's Knowledge, Attitude, Practice (KAP) and Nutritional Status in Southern Ethiopia. *Journal of Food Research*. 2018;7(3).
78. BOGART LM, ELLIOTT MN, UYEDA K, HAWES-DAWSON J, KLEIN DJ, SCHUSTER MA. Preliminary healthy eating outcomes of SNaX, a pilot community-based intervention for adolescents. *Journal of Adolescent Health*. 2011;48(2):196-202.
79. FRENCH SA, STORY M, FULKERSON JA, HANNAN P. An environmental intervention to promote lower-fat food choices in secondary schools: outcomes of the

- TACOS Study. *American journal of public health*. 2004;94(9):1507-12.
80. SEBIRE SJ, JAGO R, BANFIELD K, EDWARDS MJ, CAMPBELL R, KIPPING R, et al. Results of a feasibility cluster randomised controlled trial of a peer-led school-based intervention to increase the physical activity of adolescent girls (PLAN-A). *International Journal of Behavioral Nutrition and Physical Activity*. 2018;15(1):50.
  81. BOYLE J, MATTERN CO, LASSITER JW, RITZLER JA. Peer 2 peer: efficacy of a course-based peer education intervention to increase physical activity among college students. *Journal of American College Health*. 2011;59(6):519-29.
  82. SHAH S, FOLEY B, SHREWSBURY V, VENCHIARUTTI R, BONNEFIN A, LOK C, et al. Impact of the SALSA Program in High Schools in Western Sydney. 2016.
  83. WEISZ AN, BLACK BM. Peer education and leadership in dating violence prevention: Strengths and challenges. *Journal of Aggression, Maltreatment & Trauma*. 2010;19(6):641-60.
  84. MCHUNU G, PELTZER K, TUTSHANA B, SEUTLWADI L. Adolescent pregnancy and associated factors in South African youth. *African health sciences*. 2012;12(4):426-34.
  85. NTSABO M. Stats SA: Women and children hit hardest by poverty [Internet]. *The Daily Vox*. 2017 [cited 2021 Jan 5]. Available from: <https://www.thedailyvox.co.za/stats-sa-women-and-children-hit-hardest-by-poverty-mihlali-ntsabo/>
  86. SCHNETTLER B, MIRANDA H, MIRANDA-ZAPATA E, LOBOS G, DENEGRI M, LAPO M, et al. Diet quality and satisfaction with different domains of life in single- and dual-headed households: Comparing mother-adolescent dyads. *Children and Youth Services Review*. 2018;89:124-31.
  87. REICKS M, BANNA J, CLUSKEY M, GUNTHER C, HONGU N, RICHARDS R, et al. Influence of parenting practices on eating behaviors of early adolescents during independent eating occasions: implications for obesity prevention. *Nutrients*. 2015;7(10):8783-801.
  88. PEDERSEN TP, HOLSTEIN BE, KRØLNER R, ERSBØLL AK, JØRGENSEN TS, AARESTRUP AK, et al. Lunch frequency among adolescents: associations with socio-demographic factors and school characteristics. *Public health nutrition*. 2016;19(5):872-84.
  89. BAEK YJ, PAIK HY, SHIM JE. Association between family structure and food group intake in children. *Nutrition research and practice*. 2014;8(4):463-8.
  90. OHLY H, PEALING J, HAYTER AK, PETTINGER C, PIKHART H, WATT RG, et al. Parental food involvement predicts parent and child intakes of fruits and vegetables. *Appetite*. 2013;69:8-14.
  91. STEWART SD, MENNING CL. Family structure, non-resident father involvement, and adolescent eating patterns. *Journal of Adolescent Health*. 2009;45(2):193-201.
  92. VAN IJZENDOORN MH, PALACIOS J, SONUGA BARKE EJ, GUNNAR MR, VORRIA P, MCCALL RB, et al. Children in institutional care: Delayed development and resilience. *Monographs of the Society for Research in Child Development*. 2011;76(4):8-30.
  93. PARK H, BOTHE D, HOLSINGER E, KIRCHNER HL, OLNESS K, MANDALAKAS A. The impact of nutritional status and longitudinal recovery of motor and cognitive milestones in internationally adopted children. *International journal of environmental research and public health*. 2011;8(1):105-16.
  94. TOSKA E, CLUVER L, ORKIN M, BAINS A, SHERR L, BEREZIN M, et al. Screening and supporting through schools: educational experiences and needs of adolescents living with HIV in a South African cohort. *BMC public health*. 2019;19(1):272.
  95. STATISTICS SOUTH AFRICA. Census 2011: Statistical Release [Internet]. Pretoria, South Africa: Statistics South Africa; 2012 [cited 2020 Nov 11]. Available from: <https://www.statssa.gov.za/publications/P03014/P030142011.pdf>
  96. LAPPALAINEN K, MANNINEN P, RÄSÄNEN K. Association among sociodemographic factors, work ability, health behavior, and mental health status for young people after prolonged unemployment. *Workplace health & safety*. 2017;65(2):65-73.
  97. ANTIN TM, PASCHALL MJ. Weight perception, weight change intentions, and alcohol use among young adults. *Body image*. 2011;8(2):149-56.
  98. EICHEN DM, CONNER BT, DALY BP, FAUBER RL. Weight perception, substance use, and disordered eating behaviors: comparing normal weight and overweight high-school students. *Journal of youth and adolescence*. 2012;41(1):1-13.
  99. PASCH KE, KLEIN EG, LASKA MN, VELAZQUEZ CE, MOE SG, LYTTLE LA. Weight misperception and health risk behaviors among early adolescents. *American journal of health behavior*. 2011;35(6):797-806.
  100. WORLD HEALTH ORGANIZATION. Global Status Report on Alcohol and Health 2018 [Internet]. World Health Organization; 2019. (Nonserial Publications). Available from: <https://books.google.co.za/books?id=qnOy-DwAAQBAJ>
  101. MARTÍN-CAÑAVATE R, SONEGO M, SAGRADO MJ, ESCOBAR G, RIVAS E, AYALA S, et al. Dietary patterns and nutritional status of HIV-infected children and adolescents in El Salvador: A cross-sectional study. *PLoS one*. 2018;13(5):e0196380.

102. ALMEIDA FJ, KOCHI C, SÁFADI MAP. Influence of the antiretroviral therapy on the growth pattern of children and adolescents living with HIV/AIDS. *Jornal de pediatria*. 2019;95:S95-101.
103. DEEKS SG, LEWIN SR, HAVLIR DV. The end of AIDS: HIV infection as a chronic disease. *The Lancet*. 2013;382(9903):1525-33.
104. SIMBAYI L, RANDALL S, ZUMA K, ZUNGU N. South African National HIV Prevalence, Incidence, Behaviour and Communication Survey 2017 [Internet]. HSRC Press; 2019. Available from: <https://books.google.co.za/books?id=GKWdwgEACAAJ>
105. UNITED NATIONS. Youth with disabilities [Internet]. n.d. [cited 2021 Jan 8]. Available from: <https://www.un.org/development/desa/disabilities/youth-with-disabilities.html>
106. MITRA S, POSARAC A, VICK B. Disability and poverty in developing countries: a multidimensional study. *World Development*. 2013;41:1-18.
107. WARD CL, ARTZ L, LEOSCHUT L, KASSANJEE R, BURTON P. Sexual violence against children in South Africa: A nationally representative cross-sectional study of prevalence and correlates. *The Lancet Global Health*. 2018;6(4):e460-8.
108. BURTON P, WARD C, ARTZ L, LEOSCHUT L. The Optimus study on child abuse, violence and neglect in South Africa. Cape Town: The Centre for Justice and Crime Prevention. 2015;
109. RUBIO-LÓPEZ N, MORALES-SUÁREZ-VARELA M, PICO Y, LIVIANOS-ALDANA L, LLOPIS-GONZÁLEZ A. Nutrient intake and depression symptoms in Spanish children: the ANIVA study. *International journal of environmental research and public health*. 2016;13(3):352.
110. KULKARNI A, SWINBURN B, UTTER J. Associations between diet quality and mental health in socially disadvantaged New Zealand adolescents. *European Journal of Clinical Nutrition*. 2015;69(1):79-83.
111. COLLISHAW S, MAUGHAN B, GOODMAN R, PICKLES A. Time trends in adolescent mental health. *Journal of Child Psychology and psychiatry*. 2004;45(8):1350-62.
112. TWENGE JM. Generational differences in mental health: Are children and adolescents suffering more, or less? *American journal of orthopsychiatry*. 2011;81(4):469.
113. JACKA FN, KREMER PJ, LESLIE ER, BERK M, PATTON GC, TOUMBOUROU JW, et al. Associations between diet quality and depressed mood in adolescents: results from the Australian Healthy Neighbourhoods Study. *Australian & New Zealand journal of psychiatry*. 2010;44(5):435-42.
114. CLARKE V, BRAUN V, HAYFIELD N. Thematic analysis. *Qualitative psychology: A practical guide to research methods*. 2015;222-48.

## 10. ANNEXURE A

**TABLE 4:** Summary of key emerging points from the stakeholder interviews per question.

<p><b>1. What programmes do you have in place for prevention of poor diet and physical inactivity? Are there any programmes which try to foster healthy eating habits and PA?</b> n=8</p>	<p><b>NDoH: Health Promotion Unit</b></p> <ol style="list-style-type: none"> <li>1. Run Healthy Lifestyle Programme</li> <li>2. Support Integrated School Health Programme (ISHP) through development of curriculum</li> <li>3. Advocate for Health Promoting Schools</li> <li>4. Developed the National Obesity Strategy which is implemented in the provinces</li> <li>5. Work with Department of Social Development and Sport, Arts and Culture to promote PA through programmes like Move for Health, Recreational Day and the Big Walk which are commemorated annually.</li> </ol> <p><b>NDoH: Adolescent/Youth Health Unit</b></p> <ol style="list-style-type: none"> <li>1. Work with DoBE on the ISHP in implementing the School Tuckshop policy</li> </ol> <p><b>NDoH: Nutrition Directorate</b></p> <ol style="list-style-type: none"> <li>1. Work with the DoBE on the National School Nutrition Programme (NSNP) to ensure that the meals are healthy</li> <li>2. National Nutrition and Obesity Week (NNOW) is commemorated annually in collaboration with DoBE and youth are always included.</li> <li>3. Working with restaurants, retailers, and food manufacturers to change the food environment which affects youth</li> </ol> <p><b>DoBE:</b></p> <ol style="list-style-type: none"> <li>1. National School Nutrition Programme including the provision of nutritious meals and nutrition education in various formats.</li> <li>2. School Sports Programme in conjunction with the Department of Social Development and Sport, Arts and Culture</li> <li>3. Participate in NNOW and World School Milk Day</li> <li>4. Schools Food Gardening Project (mentioned by Adolescent/Youth Health)</li> </ol> <p><b>WHO</b></p> <p>Development of publications and guidelines related to preventing NCDs through a healthy diet and PA focused on adolescence.</p>
<p><b>2. Is this age group a priority group for your Department?</b> n=2</p>	<p>Two respondents provided an answer to this question. There is a dedicated Adolescent/Youth Unit that focuses on this group specifically and it is therefore a priority for the DOH. Another respondent indicated that government needs to prioritise all age groups and develop programmes to suit their needs e.g. Youth Friendly Services at clinics.</p>

<p><b>3. Main challenges- adolescence and having a poor diet.</b> n=8</p>	<ul style="list-style-type: none"> <li>• Advertising and marketing (e.g. using celebrity influencers on social media platforms); n=4</li> <li>• Cost of healthy foods in the context of poverty/unhealthy foods cheaper/prioritisation of starch and protein over fresh fruit and vegetables when less money is available for food; n=4</li> <li>• Peer pressure, possibly linked to social media; n=3</li> <li>• Physical availability of foods at schools, tuck shops, vendors (unhealthy foods more available); n=3</li> <li>• Lack of correct culture of how food is prepared / not knowing how to prepare healthy foods that tastes good / little education on food and healthy options; n=3</li> <li>• Food preferences for unhealthy options (unhealthy options are appealing / taste preferences for salty and sugary foods / love going out as the food is appealing and tastes good); n=3</li> <li>• Lack of/poor knowledge, possibly linked to semi-independence/autonomy of making own food choices and living away from home; n=2</li> <li>• Home food environment (how appealing the food is / how food is prepared at home / household food consumption behaviour); n=2</li> <li>• Fad and crash dieting behaviour; n=1</li> <li>• Eating unhealthy foods coupled with excessive use of screens / not being involved in play or PA after school; n=1</li> </ul>
<p><b>4. Main challenges- adolescence and lack of PA.</b> n=7</p>	<ul style="list-style-type: none"> <li>• Concerns about safety; n=4</li> <li>• Lack of resources e.g. limited space for sports fields at some schools / lack of available exercise equipment/ access to parks; n=3</li> <li>• Screen time e.g. gaming, TV, social media due to personal preferences / being home alone after school due to parents being at work; n=2</li> <li>• Sport being competitive and investment into those with athletic talent instead of PA being something that everyone should do; n=2</li> <li>• Lack of finances for parents to pay for PA classes / gyms; n=2</li> <li>• Loss of community neighbourly structure where children go outside and play with their neighbours; n=1</li> <li>• Lack of sporting activities in some schools; n=1</li> <li>• Lack of knowledge of the benefits of PA; n=1</li> <li>• Lack of personal motivation to exercise; n=1</li> </ul>

<p><b>5. Is the DoBE providing enough programmes or doing enough to encourage healthy eating and PA at schools?</b> n=8</p>	<p><b>General:</b></p> <ul style="list-style-type: none"> <li>• Perception that the DoBE are trying although this is not their core mandate; n=1</li> <li>• It depends on the school; n=1</li> <li>• Perception that DoBE is not doing enough due to a lack of political commitment; n=1</li> <li>• The DoBE is promoting healthy lifestyles through nutrition education (NE) in the NSNP and during LS and LO; n=1</li> <li>• Comments relating to the curriculum:</li> <li>• Perception that the nutrition section of LO is very basic (5 food groups) and does not address the specific needs of adolescents / needs to improve to include portion control, natural foods, drinking water / improvement especially among primary school learners as this is the foundation for healthy habits; n=3</li> <li>• Perception that the DoBE has reduced many programmes at school and that there has been a shift in focus from school sports to classroom programmes including LO; n=1</li> <li>• Statement that the LO subject has fewer hours than the other subjects; n=1</li> <li>• Township schools don't have sporting activities and facilities; n=1</li> <li>• Learners are not challenged to participate in sport or PA; n=1</li> <li>• Grade R-3's have periods where they go outside and play but once they start with Grade 4, these classes become less and less and eventually subside; n=1</li> <li>• The coverage of nutrition and PA is not widely spread throughout the curriculum as some subjects are not covered for some grades in the CAPS document. The support of partners in the NE and PA fields are strongly encouraged in schools; n=1</li> <li>• Comments relating to teachers/school food environment:</li> <li>• There isn't commitment to policies for tuck shops to sell healthy foods; n=1</li> <li>• There is budget for teacher assistants and sport teachers are young, but it seems that they are not committed to these things; n=1</li> </ul>
<p><b>6. Barriers to implementing these programmes.</b> n=2</p>	<p>Only 2 respondents indicated what they perceived to be the main barriers to running these programmes. These included it not being the DoBE's mandate to run the programmes, lack of infrastructure in public schools, limited personnel responsible for programme implementation, teacher fatigue and budget constraints.</p>
<p><b>7. In what way does your department interact with the DoBE regarding diet and PA?</b> n=2</p>	<p>Only 2 respondents from the NDoH: Health Promotion answered this question. They indicated that they work with the DoBE in the following ways:</p> <ul style="list-style-type: none"> <li>• Support the ISHP by contributing to the development of the curriculum for the inclusion of healthy eating and PA, and the harmful use of tobacco products.</li> <li>• Support of the Health Promoting Schools Programme by advocating for a conducive environment (healthy eating guidelines for tuck shops and school vendors; encourage the establishment of school gardens; development of no smoking school policy).</li> </ul>

**8. What do you think should be the key nutrition messages regarding a healthy diet aimed at youth?**  
n=7

**General (n=3)**

- Not to scare the youth by focusing more on messages relating to the benefits rather than harms of not eating healthily.
- Taking the FBDGs and presenting them in a way that is suitable to the youth. The way the messages are packaged, and the platforms used is what matters.
- The DoBE align communication on healthy eating with the FBDGs in collaboration with the NDoH. The NSNP aligns lunch meals to these guidelines and the Tuck shop guideline also emphasises healthy choices. The DoBE and the NDoH have developed a document called the 'Blueprint for improving the school food environment' that will be launched in 2021.

**Specific messages provided collectively (n=4)**

- Drink more water than sweet beverages,
- Eat more fruit and vegetables daily,
- Avoid eating snacks high in salt, fat, and sugar,
- Reduce the consumption of high-density drinks and processed food, which are high in salt, fat and sugar,
- Read labels on food and choose food with lower salt, fat, and sugar content,
- Grill, boil, or steam food instead of frying,
- Avoid eating while watching TV, as you might consume more food.
- Eat healthy when you are young and live long.
- Youth are to take care of themselves and to invest in their bodies because when they grow, they need good nutrients to become healthy so that they can avoid all these NCDs.
- Drink water.
- The importance of eating a balanced diet and the 7 colours of a balanced meal.
- Eat from farm to kitchen where nothing must go via a factory.

**9. 9- What do you think should be the key messages aimed at youth regarding improving PA?**  
n=5

**General (n=1)**

The concept of dancing instead of focusing on sport to keep fit was considered to be a good idea, however not knowing with the COVID-19 pandemic was going to end was cited as a reason for this been challenging, especially in traditional township schools / schools with more than 1000 learners.

**Specific messages provided collectively (n=4)**

- Participate in PA at school and at home,
- Engage in PA for at least 30 minutes a day for at least 3 times a week,
- Always play active games with friends and family members,
- Walk inside the house and yard,
- Perform gardening and routine household tasks,
- Being physical active improves your body image and confidence.
- PA doesn't mean going to the gym, any active movement is good enough.
- Walk for 30 mins a day and it doesn't have to be aggressive but just make sure you increase your heart rate a couple of times per day.
- Choose a range of activities you like or think you might like to try.
- Be active with your friends. You are more likely to keep active if it's fun and you have people to enjoy it with.
- Walk more: to school, to visit friends, to shops, or other places in your neighbourhood.
- Try to limit time spent watching TV, videos or DVDs, surfing the net or playing computer games, especially during the day and on weekends.
- Take your dog or a neighbour's dog for a walk.
- Be active with family members - in the yard and on family outings.
- Encourage and support younger brothers and sisters to be active.
- Try a new sport or go back to one you have played before.
- Take a class to learn a new skill such as yoga, kick boxing, dancing or diving.
- Check out the activities at your local recreation centre, clubs or youth centre.
- Put on some music and dance.

<p><b>10. Can you suggest ways of making youth more aware of NCDs and its prevention? How can we get the message through to young people?</b> n=7</p>	<ul style="list-style-type: none"> <li>• Social media/media (SMS, Facebook, Instagram, YouTube on school pages and websites, online dialogue with parents including the public; social media campaigns (cost of these campaigns cited as a barrier), messages and discussions using technology platforms, educational TV channels; n=3</li> <li>• Community engagement (engage SGB's, teachers, parents, and tuck shops/vendors; choir eisteddfod cited as key event for social messages that reach about 7000 learners and teachers through music/songs by youth and booklets), n=2</li> <li>• Youth are included in committees focused at improving the health of the youth/ the youth are considered to have the capacity to add value to solutions for NCDs; n=2</li> <li>• Interpersonal one-on-one engagement through hotline counselling, interacting, online engagements through B-Wise app; n=1</li> <li>• Provide regular health information to the youth so that they can make informed decisions; n=1</li> <li>• Youth are not seeing the connection between poor lifestyles and adulthood NCDs; n=1</li> <li>• Youth were not the focus of NCDs in the past and research in this area may be an issue; n=1</li> <li>• Too few youth have access to relevant and reliable health information and to high-quality and youth-friendly health services without facing discrimination or other obstacles; n=1</li> <li>• Young people are often targeted by companies advertising unhealthy food, tobacco, or alcohol use, and many grow up in environments that are not favourable to adopting healthy lifestyles; n=1</li> </ul>
<p><b>11. Do you know of any NCD initiatives that are led by youth in SA?</b> n=4</p>	<p>Two respondents indicated that they were not aware of any initiatives. One of these respondents indicated that these may be available but that they may be known by other Departments that run youth programmes like B-Wise and Conquer.</p> <p>One respondent mentioned an NGO called 'Harvey' that are raising awareness of what is in your food.</p> <p>The DoBE indicated that youth can lead programmes to promote healthy behaviour, such as community exercise classes, or healthy eating programmes. They also mentioned that young medical and allied health students also have a unique opportunity to get involved. Students on clinical rotations can promote effective disease prevention measures e.g. tobacco cessation.</p>
<p><b>12. Is there anything else you would like to mention or ask me?</b> n=4</p>	<p>Four respondents shared additional comments.</p> <p>There should be dedicated funding for prevention interventions for NCDs among youth and adolescents, and monitoring and evaluation of such interventions should be strengthened; n=1</p> <p>Use the impact of COVID-19 and the lessons about co-morbidities as an awareness platform on the dangers of NCDs; n=1</p> <p>It is important that the Youth Risk Behaviour Study be conducted again; n=1</p> <p>Making exercising at a school a priority and making physical education compulsory was highlighted as important; n=1</p>

