HEALTHY ACTIVE KIDS SOUTH AFRICA REPORT GARD

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RHODES UNIVERSITY



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INTRODUCTION

There is no disputing the benefits of physical activity and active play for the physical health and mental wellbeing of children and adolescents. And there is increasing evidence of the adverse effects of sitting too much and spending too much time on screens. While technology has its place, screen time also takes away from face-to-face interactions between peers, and can impact negatively on the emotional well-being of children. We know that what children and adolescents eat and drink is also critical for good health and maintaining a healthy weight. And these healthy lifestyle behaviours have been shown to have a positive impact on children and adolescents' cognitive development and school achievement as well.

The Healthy Active Kids South Africa (HAKSA) Report Card presents the most current and best available evidence on physical activity and nutrition of South African children and adolescents, aged between 3-18 years. Grades are given for a range of indicators relating to physical activity and nutrition that tell us how well our children and adolescents are doing in these categories. The HAKSA 2018 Report Card builds on previous evidence from the 2007, 2010, 2014 and 2016 versions, focussing on research that has been published in the last 2 years. This evidence provides the basis on which to guide policy, develop programmes, and strengthen advocacy to create environments that support healthy eating, and opportunities to be more physically active and sit less amongst South African children and adolescents.

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PHYSICAL ACTIVITY

Overall physical activity Early childhood physical activity Organised sport participation Active play Active transportation Sedentary behaviours* Early childhood sedentary behaviours* Physical fitness Family and peers School Community and environment Government

NUTRITION

Fruit and vegetable intake Snacking, sugar-sweetened beverages, dietary sodium, fast food intake School tuck shops National School Nutrition Programme Vegetable gardens Food security Advertising and media Overweight/obesity Undernutrition Early childhood overweight, obesity and undernutrition

* Sedentary behaviours refer to sitting behaviours, including screen time. Screen time includes time spent using cellphones, television, computers and tablets.

Grade	Definition*
A	Succeeding with a large majority of children and youth (81% to 100%)
В	Succeeding with well over half of children and youth (61% to 80%)
С	Succeeding with about half of children and youth (41% to 60%)
D	Succeeding with less than half but some children and youth (21% to 40%)
F	Succeeding with very few children and youth (0% to 20%)
INC	Inconclusive due to insufficient data

* For indicators where prevalence data was lacking, additional criteria were considered in the grading process, as was done for previous HAKSA Report Cards. These include the effectiveness of the practice or programme, and the extent to which the practice or programme was implemented.

HAKSA 2018 SCIENTIFIC ADVISORY GROUP



The HAKSA 2018 Report Card was developed and produced by a scientific advisory group consisting of 30 academics and/or content experts from 14 institutions/organisations in the fields of physical activity and nutrition, plus expertise in media and marketing.

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PHYSICAL ACTIVITY INDICATORS

Overall physical activity

About half of SA children are meeting the recommendation for levels of physical activity, averaging between 57 and 65 minutes of moderateto vigorous-intensity physical activity per day (5-7). Those with higher physical activity levels are less likely to be obese (6) or to use tobacco and marijuana (8), and are more likely to have a better quality of life (9) and motor skills (10). The grade remains a C since there is no new evidence to show that children and adolescents are more active.



Early childhood physical activity

Levels of physical activity appear to be higher in younger South African children, compared to older children. In one study, 100% of preschool-aged children (11) met the previous physical activity guideline, and a study of pre-schoolers from a rural area found that 78.2% of them met the new guidelines (12). Although pre-schoolers have good gross motor skills (11-13), there seem to be several barriers to preschool-aged children engaging in active play. These include crime, the lack of resources, space and facilities in lower income areas (14-16), and screens in higher income areas (15). Although physical activity levels in this age group are good, a grade of A- was given to indicate the need for these barriers to be addressed.

Organised sport participation



The grade remains a D as there was no evidence to suggest a change in the number of children and adolescents participating in organised sport since 2016. There is also no evidence of new interventions, strategies or policies to improve participation levels.

Active play INC



Active transportation

The grade remains a C, since there is no evidence to suggest that more children and adolescents are walking or cycling to school, or that walking to school has become safer. Around 80% of children and adolescents walk to school without adult supervision in low-income areas where safety is a concern (17,18). Almost two-thirds of parents are uncomfortable with their child walking to school (18), but lack the necessary resources to change this. While there are some local initiatives to improve the safety of children and adolescents on their way to/from school, it's not clear if these are adequately reaching potentially vulnerable children, and/or if these initiatives are feasible and sustainable.

Sedentary behaviours



There is no evidence to suggest that screen time use is declining, and it may in fact be increasing, as smart phones become more accessible and affordable. Children were found to spend an average of just over 3 hours on screens per day (not including school work), with only a third of children meeting the screen time recommendation for their age (6,7). In another study with adolescents, screen-based social networking was linked to increased risky behaviours (19). Since recreational screen time use is not decreasing, and because of the risks of excess screen time in adolescents, the grade remains a F.

What are the guidelines for physical activity for children and adolescents?

School-aged children and adolescents are recommended to get 1 hour of moderate- to vigorousintensity physical activity (that increases their heart rate) per day (<u>www.csep.ca</u>).

Physical activity guidelines for preschoolers previously recommended 3 hours of any physical activity (1,2). These have recently been updated to include at least 1 hour of 'energetic play' in these 3 hours (3,4).



PHYSICAL ACTIVITY INDICATORS



Early childhood sedentary behaviours INC

Children attending preschools in a range of areas spend about 70% of their preschool day sitting (11,12). Close to 100% of pre-schoolers in a rural area (12) met screen time guidelines, but 94% of infants and toddlers from a low-income, urban area were reported to exceed screen time guidelines, and more TV time was related to unhealthy weight (20). Although these children were below the age-range for the Report Card, it highlights a potential problem in years to come. Since there is still only limited evidence, the grade is inconclusive.



There is no recent data reporting on fitness levels in children and adolescents, so the grade was changed to inconclusive.

Family and peer support

There is very little data on parent and peer support for physical activity, but recent evidence (21) seems to support what we already knew about the importance of parent support. As a result, the grade remains a C-. This is an area which has real potential for change through community-based physical activity programmes, local park upgrades, and initiatives such as parkrun.

School



In terms of physical education in the curriculum, the policy-implementation gap appears to be widening. In a study of 12 countries, South Africa had the greatest percentage of learners (32%) who were NOT participating in physical education at school (22). There seems to be no clear evidence of progress in the prioritisation of physical education in the school curriculum or school environment at a national level. This is despite the fact that there is overwhelming international evidence that physical activity and physical education in schools is positively associated with academic achievement. The grade has therefore been lowered to a D-.

Community and environment

Children living in unsafe areas with high traffic risks have been found to be less active after school (23). Although there are various initiatives that address the safety of children in communities, these efforts appear to be few and far between, and largely limited to local initiatives. The grade, therefore, remains a C.

Government

The Sport and Recreation South Africa National School Sport Programme remained a key deliverable in the 2016-2017 strategic plan; and with commitment from the National Department of Basic Education, gimed to maximise access to sport, recreation and physical activity in every school in South Africa. However, the implementation of this programme appears to be limited, and the evaluation of this programme is not well documented. There is also no evidence of new physical activity or sport policies that could benefit children and adolescents. The grade has therefore been lowered to a C-.

> What are the guidelines for screen time for children and adolescents?

- School-aged children: <2 hours of recreational screen time (<u>www.csep.ca</u>).
- Preschool children: <1 hour of screen time
- Children <2 years: NO screen time (3,4)

All grades awarded in the HAKSA 2018 Report Card take into consideration the grade given in the HAKSA 2016 Report Card. Grades can remain the same as, be improved on, or be lowered from the 2016 grade.

Fruit and vegetable intake 卫

Only 1 out of 5 schools serve the recommended quantity of fruit and vegetables as part of the National School Nutrition Programme (25). Based on this statistic, and the fact that no other studies were found to indicate improvement, the grade remains a D.

Snacking, sugar-sweetened beverages, salt, fast food

Despite the bleak economic climate in South Africa, the fast food industry is growing, and sales of sugar-sweetened beverages (SSBs) are on the rise (26). In the 12-country study mentioned earlier, South African

children had the highest intake of SSBs of all countries (27), with children in the lowest income groups being more likely to have an unhealthy diet than children in the highest income groups (28). Although the sugar tax, and the salt regulations for food introduced in 2016 aim to reduce sugar and salt intake, we don't know yet if these are impacting on children and adolescents' behaviour. And while these policy initiatives are encouraging, the grade remains an F.

School nutrition culture and environment

This indicator includes school tuck shops, vegetable gardens and nutrition education in the school curriculum. Although several sets of guidelines and programmes to establish healthy school tuck shops are available, the implementation of these is not regulated. Food bought from tuckshops or vendors is mostly of poor nutritional value, high in calories, and full of added salt and sugar (29). This is concerning, as about 50% of school-going children in South Africa regularly buy food at school, and do not take lunch boxes (29). Of the schools that provide meals to learners, 40% have food gardens that can supplement these meals; but only 1 in 5 gardens are well maintained, and just less than a third have vegetables growing in them (25). Getting nutrition education into the curriculum remains a challenge (30). Due to the lack of progress for this indicator, a grade of D- was given.

National School Nutrition Programme

The National School Nutrition Programme provides meals to >9 million children in public schools (quintiles 1-3), with an average of R2.51 spent per child each day (31). Although the proportion of schools serving the meals (96%) and learners observed eating the meal (73%) was high, far fewer children said they eat the meal (25). Challenges with the implementation of this programme include: children not receiving the recommended amount and type of foods; the nutritional quality of meals being less than optimal; food being served too late (after 10h00 in 82% of schools) to help children concentrate better in class; and health and safety concerns regarding food preparation. Furthermore, there are days and in some cases, months, that school feeding does not take place, due to schools not receiving funds, late delivery of foods, or lack of fuel for cooking (25). Due to these challenges, the grade has been lowered to a C.









Food security 💾

The dire economic situation in South Africa directly influences individual and household food security, with children age 17 years and younger being one of the most vulnerable groups to be affected (32,35). In 2016, 1 in 5 households ran out of money to buy food in the previous 12 months (36), with up to 77% of households in rural areas not having enough food by the end of the month (37). Since the factors contributing to food insecurity appear to be worsening (or at least not improving), the grade has been lowered to a D-.



Advertising and media \mathbf{P}



Draft regulations from 2014 relating to the marketing of food and beverages to children have still not been passed by government (38), and food manufacturers make unfounded claims about the nutritional value of their products - one example being children's cereals (e.g. claiming high fibre content) (39). Although there are some promising industry initiatives, such as the removal of sweets and chocolates from checkout points and providing free fruit to children in some food stores, these affect only a small proportion of the population. Due to the lack of adequate action by government and industry, the grade has been lowered to a D-.

Overweight and obesity



Overweight/obesity is increasing in South Africa children and adolescents, with the highest risk in children aged 8-10 years old, and especially amongst girls (40). Other studies have shown that overweight/obesity are a concern amongst girls in rural areas as well (41), and that overweight/obesity places the health of South Africa children and adolescents at risk (42). Since the high prevalence of overweight/obesity persists, the grade remains a D.

Undernutrition

Many older children don't get enough nutritious food to eat each day. Undernutrition thus remains a significant problem (43-46), and the grade remains a C. Children from low-income areas are more likely to be stunted (short for their age) (43), and the impact of this on cognition has also been documented in children (47).

Early childhood overweight, obesity and undernutrition





A country struggling to make ends meet:

- Just over half of South Africans live on R30 or less per day, while the number of South Africans living in extreme poverty (<R441 per person per month) has increased by 2.8 million in the last 4 years (32).
- The current unemployment rate of 27.2% (June 2018) indicates no improvement over the past two decades (33).
- Over the past 3 years the country has experienced the worst drought in more than 100 years which has impacted on both meat and crop production.
- Food inflation spiked from 10.5% in April 2016 to 11.8% in December 2016, thereafter decreasing to most recent levels of 3.5% in June 2018 (34).

WHERE TO FROM HERE?

Research from the last 2 years indicates that there have been no major changes in any of the indicators since the 2016 Report Card – nothing has gotten much worse, but no area has improved either. On the plus side, our young South Africans seem to do better on the physical activity front when there are others involved. This highlights that they may be more likely to succeed in this area if their efforts are social, and community-based, rather than individual. Higher levels of physical activity amongst our youngest children suggest that the early years provide a crucial window of opportunity to establish this healthy behaviour. And that physical activity initiatives would do well to consider ways to help maintain these high activity levels going into the primary school years.



On the nutrition side, the National School Nutrition Programme should be commended for continuing to meet a serious need amongst learners, particularly in light of the economic challenges that South Africa is facing.

Certain indicators have been downgraded from the 2016 Report Card to put them under the spotlight. These include policies on physical activity and nutrition in the school environment, and on food and beverage advertising and media; as well as food insecurity. Despite some positive efforts, not enough is being done to improve access to nutritious food for those living in the poorest of circumstances in our country, while the fast food and sugar-sweetened beverage industries are thriving. Failure to act will have a significantly negative impact on the health, well-being and development of our nation's children and adolescents.

We need more research, especially national studies, that can help us monitor these indicators. There are some indicators that we don't have a firm handle on, such as the amount of time spent on screens, and the advertising of snacks, sugar-sweetened beverages and fast foods on social media. With an increase in accessibility to electronic media, and the rise in social media engagement by children and adolescents in South Africa, along with the global shift to digital forms of marketing, it becomes increasingly important to track what children and adolescents are being exposed to, and how it might impact on their health behaviour.



PHYSICAL ACTIVITY	2016	2018
Overall physical activity	С	С
Early childhood physical activity	INC	A-
Organized sport participation	D	D
Active play	INC	INC
Active transportation	С	С
Sedentary behaviours	F	F
Early childhood sedentary behaviour	-	INC
Physical fitness	D	INC
Family and peer support	C-	C-
School	D	D-
Community and environment	C-	C-
Government	В	С
NUTRITION		
Fruit and vegetable intake	D	D
Snacking, SSBs, dietary sodium	F	F
Fast food intake	F	
School tuck shop	INC	D-
Vegetable gardens	С	
National School Nutrition Programme	В	С
Food security	D	D-
Advertising and media	D	D-
Overweight/obesity	D	D
Undernutrition	С	С
Early childhood overweight, obesity and undernutrition	D	D

WHERE TO FROM HERE?

Our country cannot afford to have 'more of the same' when it comes to matters related to the health and wellbeing of our country's children and adolescents. Government, the private sector and media, civil society, parents and researchers need to be working harder together to help promote healthy behaviours amongst the young people of our country, beginning as early as possible. And the healthy choice needs to be the easy choice for them – in homes, schools, communities, public spaces, and online. South Africa needs our children and adolescents to grow up as healthy and productive members of society who can help move our country forward.



Key areas for action:

- 1. The provision of safe opportunities for physical activity, particularly at a community level, and this includes children walking or cycling to school;
- Reducing the gap between policy and implementation, especially with respect to promotion of a healthy school culture and environment, and government strategies to provide opportunities for physical activity, especially physical education and sport;
- 3. The 'double burden' of over- and undernutrition overweight/obesity remains a problem, alongside food insecurity.



REFERENCES

- 1. Tremblay MS, LeBlanc AG, Carson V, Choquette L, Connor Gorber S, Dillman C, et al. Canadian Physical Activity Guidelines for the Early Years (aged 0-4 years). Applied Physiology, Nutrition, and Metabolism. 2012;37:345–369.
- 2. Department of Health. Get up and grow: healthy eating and physical activity for early childhood. 2009. Available from: <u>http://</u> www.health.gov.au/internet/main/publishing.nsf/content/npra-0-5yrs-brochure
- 3. Tremblay MS, Chaput J-P, Adamo KB, Aubert S, Barnes JD, Choquette L, et al. Canadian 24-Hour Movement Guidelines for the Early Years (0–4 years): an integration of physical activity, sedentary behaviour, and sleep. BMC Public Health. 2017;17(S5):874.
- 4. Okely AD, Ghersi D, Hesketh KD, Santos R, Loughran SP, Cliff DP, et al. A collaborative approach to adopting/adapting guidelines The Australian 24-Hour Movement Guidelines for the early years (Birth to 5 years): an integration of physical activity, sedentary behavior, and sleep. BMC Public Health. 2017;17(S5):869.
- Muthuri SK, Onywera VO, Tremblay MS, Broyles ST, Chaput J-P, Fogelholm M, et al. Relationships between Parental Education and Overweight with Childhood Overweight and Physical Activity in 9–11 Year Old Children: Results from a 12-Country Study. Hejtmancik JF, editor. PLoS ONE. 2016 11(8):e0147746.
- 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;13(123):123.
- 7. Sampasa-Kanyinga H, Standage M, Tremblay MS, Katzmarzyk PT, Hu G, Kuriyan R, et al. Associations between meeting combinations of 24-h movement guidelines and health-related quality of life in children from 12 countries. Public Health. 2017;153:16–24.
- 8. Tibbits MK, Caldwell LL, Smith EA, Vergnani T, Wegner L. Longitudinal patterns of active leisure among South African youth: gender differences and associations with health risk behaviours. World Leisure Journal. 2016;58(1):60–68.
- Salvini M, Gall S, Müller I, Walter C, Randt Du R, Steinmann P, et al. Physical activity and health-related quality of life among schoolchildren from disadvantaged neighbourhoods in Port Elizabeth, South Africa. Quality of Life Research. 2017;27(1):205– 216.
- 10. van Niekerk L-L, Toit Du D, Pienaar AE. The correlation between motor proficiency and physical activity in Senior Phase learners in the Potchefstroom area. Health SA Gesondheid. 2016;21:348-355.
- 11. Draper CE, Tomaz SA, Stone M, Hinkley T, Jones RA, Louw J, et al. Developing intervention strategies to optimise body composition in early childhood in South Africa. Biomed Research International. 2017;2017(1):5283457.
- 12. Tomaz SA. Physical activity and gross motor skills in rural South African preschool children. Draper CE, Jones RA, Hinkley T, editors. University of Cape Town; 2018. Available on request.
- 13. van Heerden A, Hsiao C, Matafwali B, Louw J, Richter L. Support for the feasibility of the ages and stages questionnaire as a developmental screening tool: a cross-sectional study of South African and Zambian children aged 2-60 months. BMC Pediatrics. 2017;17(1):55.
- 14. Figueroa R, Saltzman J, Jarick Metcalfe J, Wiley A. "Culture is so interspersed": child-minders' and health workers' perceptions of childhood obesity in South Africa. Journal of Obesity. 2017;2017(2):9629748.
- 15. Stone M. Perceptions of physical activity in preschool-aged children in urban and rural samples in South Africa. Louw J, Draper C, editors. University of Cape Town; 2016. Available from: <u>https://open.uct.ac.za/bitstream/handle/11427/20652/thesis_hum_2016_stone_matthew.pdf?sequence=1</u>
- 16. Bartie M, Dunnell A, Kaplan J, Oosthuizen D, Smit D, van Dyk A, et al. The play experiences of preschool children from a lowsocio-economic rural community in Worcester, South Africa. Occupational Therapy International. 2016 Jun;23(2):91–102.
- 17. Koekemoer K, Van Gesselleen M, Van Niekerk A, Govender R, Van As AB. Child pedestrian safety knowledge, behaviour and road injury in Cape Town, South Africa. Accident Analysis and Prevention. 2017;99(Pt A):202–209.
- 18. Simons A, Koekemoer K, Van Niekerk A, Govender R. Parental supervision and discomfort with children walking to school in low-income communities in Cape Town, South Africa. Traffic Injury Prevention. 2018;19(4):1–33.
- Dietrich JJ, Laher F, Hornschuh S, Nkala B, Chimoyi L, Otwombe K, et al. Investigating Sociodemographic Factors and HIV Risk Behaviors Associated With Social Networking Among Adolescents in Soweto, South Africa: A Cross-Sectional Survey. JMIR Public Health and Surveillance. 2016;2(2):e154.
- 20. Prioreschi A, Brage S, Hesketh KD, Hnatiuk J, Westgate K, Micklesfield LK. Describing objectively measured physical activity levels, patterns, and correlates in a cross sectional sample of infants and toddlers from South Africa. International Journal of Behavioral Nutrition and Physical Activity. 2017;14(1):176.
- 21. Cozett C, Basset SH, Leach L. Factors influencing participation in physical activity among 11-13 year-old school children in the Western Cape, South Africa. African Journal for Physical Activity and Health Sciences. 2016;22(4:2):1100–1107.
- 22. Silva DAS, Chaput J-P, Katzmarzyk PT, Fogelholm M, Hu G, Maher C, et al. Physical Education Classes, Physical Activity, and Sedentary Behavior in Children. Medicine and Science in Sports and Exercise. 2018;50(5):995–1004.
- 23. Uys M, Broyles ST, E Draper C, Hendricks S, Rae D, Naidoo N, et al. Perceived and objective neighborhood support for outside of school physical activity in South African children. BMC Public Health. 2016;16(1):462.

- 24. Times LIVE. Smaller soft drink sizes leave bitter taste of shrinkflation. Times LIVE. 2017 Oct 25. Available from: <u>https://www.timeslive.co.za/news/consumer-live/2017-10-25-smaller-soft-drink-sizes-leave-bitter-taste-of-shrinkflation/</u>
- 25. Hazell E. Report on the Implementation Evaluation of the National School Nutrition Programme. Pretoria: JET Education Services; 2016 Sep. Available from: <u>https://evaluations.dpme.gov.za/evaluations/528</u>
- 26. Wesgro. Beverages. Wesgro; 2016 Jun. Available from: http://www.wesgro.co.za/pdf_repository/2016_06%20Beverages.pdf
- 27. Katzmarzyk P, Broyles S, Champagne C, Chaput J-P, Fogelholm M, Hu G, et al. Relationship between soft drink consumption and obesity in 9–11 years old children in a multi-national study. Nutrients. 2016;8(12):770.
- Manyanga T, Tremblay MS, Chaput J-P, Katzmarzyk PT, Fogelholm M, Hu G, et al. Socioeconomic status and dietary patterns in children from around the world: different associations by levels of country human development? BMC Public Health. 2017;17(457):1–11.
- 29. Nortje N, Faber M, de Villiers A. School tuck shops in South Africa—an ethical appraisal. South African Journal of Clinical Nutrition. 2016;30(3):74–79.
- 30. Nguyen KA, de Villiers A, Fourie JM, Hendricks M. Challenges to implementing the food-based dietary guidelines in the South African primary school curriculum: a qualitative study exploring the perceptions of principals and curriculum advisors. South African Journal of Clinical Nutrition. 2016;30(1):15–20.
- 31. Gresse A, Nomvete A, Walter C. Situational analysis: Implementation of the National School Nutrition Programme in low socioeconomic primary schools in Nelson Mandela Bay. Journal of Consumer Sciences. 2017;2:59-68.
- 32. Statistics South Africa. Poverty Trends in South Africa. Pretoria: Statistics South Africa; 2017. Available from: <u>https://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf</u>
- 33. Statistics South Africa. Quarterly Labour Force Survey. Pretoria: Statistics South Africa; 2018. Available from: <u>http://www.statssa.</u> gov.za/publications/P0211/P02112ndQuarter2018.pdf
- 34. Trading Economics. South Africa Food Inflation. Trading Economics; 2018. Available from: https://tradingeconomics.com/south-africa/food-inflation
- 35. Hendriks SL, van der Merwe C, Ngidi MS, Manyamba C, Mbele M, McIntyre AM, et al. What are we measuring? Comparison of household food security indicators in the Eastern Cape Province, South Africa. Ecology of Food and Nutrition. 2016;55(2):141–162.
- 36. Statistics South Africa. Community Survey 2016. Pretoria: Statistics South Africa; 2016. Available from: <u>http://cs2016.statssa.gov.</u> za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-Statistical-releas 1-July-2016.pdf
- Mkhawani K, Motadi SA, Mabapa NS, Mbhenyane XG, Blaauw R. Effects of rising food prices on household food security on femaleheaded households in Runnymede Village, Mopani District, South Africa. South African Journal of Clinical Nutrition. 2016;29(2):69–74.
- 38. Department of Health. Draft Guidelines: Labelling and Advertising of Foods. Department of Health; Republic of South Africa; May 29, 2014.
- 39. Wiles NL. The nutritional quality of South African ready-to-eat breakfast cereals. South African Journal of Clinical Nutrition. 2017;30(4):93–100.
- Sartorius B, Sartorius K, Taylor M, Aagaard-Hansen J, Dukhi N, Day C, et al. Rapidly increasing body mass index among children, adolescents and young adults in a transitioning population, South Africa, 2008–15. International Journal of Epidemiology. 2017;47(3):942–952.
- 41. Craig E, Reilly JJ, Bland R. Risk factors for overweight and overfatness in rural South African children and adolescents. Journal of Public Health. 2016;38(1):24–33.
- 42. Awotidebe A, Monyeki MA, Moss SJ, Strydom GL, Amstrong M, Kemper HCG. Relationship of adiposity and cardiorespiratory fitness with resting blood pressure of South African adolescents: the PAHL Study. Journal of Human Hypertension. 2015;30(4):245–251.
- 43. National Department of Health, Statistics South Africa, South African Medical Research Council, ICF. South African Demographic and Health Survey 2016. Pretoria, South Africa and Rockville, Maryland, USA: Statistics South Africa; 2017. Available from: <u>https://www.statssa.gov.za/publications/Report%2003-00-09/Report%2003-00-092016.pdf</u>
- 44. Nyathela T, Oldewage-Theron W. Nutritional status and food consumption patterns of primary school children in orange farm. African Journal of Food, Agriculture, Nutrition and Development. 2017;17(1):11497–11517.
- 45. Oldewage-Theron W, Kruger R. The association between diet quality and subclinical inflammation among children aged 6–18 years in the Eastern Cape, South Africa. Public Health Nutrition. 2016;20(1):102–111.
- 46. Ngwenya NA, Ramukumba TS. Prevalence of adolescent obesity at a high school in the City of Tshwane. Curationis. 2017;40(1):a1662.
- 47. Ajayi OR, Matthews G, Taylor M, Kvalsvig J, Davidson LL, Kauchali S, et al. Factors associated with the health and cognition of 6-year-old to 8-year-old children in KwaZulu-Natal, South Africa. Tropical Medicine and International Health. 2017;22(5):631–637.