OPEN ACCESS Freely available online

Journal of Nutritional Disorders & Therapy

Research Article

Primary School Children Constrains Towards Practicing Healthy Diet in Limpopo Province, South Africa

Shapule Modjadji[1],Mahlapahlapana[1], Themane[1], Tsebe,[1] Molotja[1]

[1]*Department of Educational Studies*

ABSTRACT

This study explored primary school children constrains towards practicing healthy diet in rural schools and households around Limpopo Province. This qualitative case study used focus group interviews on a sample of 44 primary school students from seven rural primary schools in Dikgale village. The results revealed that even though the National School Nutrition Programme provides healthy food for learners, vendors and school tuck-shop still sell unhealthy food which makes it difficult for student to practice proper healthy diet. Also, households are unable to provide healthy food for children because of socio-economic status of families and children prefers how the food taste rather that nutritional value. This study concluded that policies with regard to what is sold within school premises are not adhered to. Also, socio-economic status of household makes it difficult for children to follow good health practices. This study proposes a healthy food intervention strategy incorporating the Theory of Planned Behaviour (TPB) and partnership training model for SMT, SGB and households. Department of Basic Education and Department of Health should constantly monitor school with regard to policy adherence on Integrated School Health Programme in order to improve good health practices on healthy diet.

Key words: Healthy diet, knowledge, health practices, behavior

INTRODUCTION

Studies have shown that overweight and obesity problems are significantly linked to unhealthy dietary patterns among the youth and adults. This is a result of what people eat and lack of knowledge on healthy lifestyle (Egner, Oza-Frank & Cunningham, 2014); (Sandercock, Voss & Dye, 2010). There is rapid increase of the prevalence of overweight and obesity in children and adolescents in many developing countries which has been reported from 1980 to 2013 (Flynn, McNeil, Maloff et al., 2006) as a result of unhealthy eating practices. Although the highest rates of obesity are generally observed in industrialized nations such as the United States (Prelip, Kinsler, Le-Thai, Erausquin & Slusser; 2012), developing nations like South Africa are experiencing a sharp increase in obesity rates as their economies have started to grow and thrive. Unhealthy eating practices has resulted in South African children recording a very disappointing low rating which is considered as the average risk for imminent disease (Steyn, Lambert, Parker, Mchiza & De Villiers, 2015). The reason being, most South African children's diet mostly consist of high sugary and fatty food. This is regardless of the South African Food-Based Dietary Guidelines (SAFBDG) that recommends that school curriculum to implement cost-effective intervention in preventing the development of non-communicable diseases and the consequences of malnutrition (WHO, 2013). In Kenya for example, children are making unhealthy food choices mainly due to lack of knowledge and incorrect perception towards healthy foods (Kyallo, Makokha & Mwangi, 2013). South Africa is also counted amongst the highest child obesity rates in Africa (Zaborskis, Lagunaite, Busha & Lubiene, 2012) which paints a bleak future for generations to come.

Children's food intake and eating behaviours have been cited as key factors in the obesity epidemic, with food accounting for the energy in component of the energy balance (Muthuri, Francis, Wachira et al, 2014). In particular, energy-dense food which are readily available, and energy containing beverages have been associated with extreme adiposity in children and young people

Corresponding to: Shapule Modjadj, Department of Educational Studies, Professor Mahlapahlapana,Johaness,Themane,University of Limpopo, Tel: +2715 268 2928; Email: mahlapahlapana.themane@ul.ac.za

Received: Dec 30, 2020; **Accepted:** August 24, 2021; **Published:** September 3, 2021

Citation: Shapule (2021) Primary school children constrains towards practicing healthy diet in Limpopo Province, South Africa. J Nutr Disorders Ther.vol 10(6);151.

(Boddy, Knowles, Davies et al, 2012). These suggest that non-communicable diseases are likely to increase if this behaviour continues to happen. Theory of Planned Behaviour (TPB) provide a basis of understanding the determinants of behaviours, one of which is understanding and predicting human behaviour (Ajzen, 2015); (Conner, Norman & Bell, 2002). What children eat, either they have acquired knowledge or not, is determined by their intentions. Children's personal food preference is seen as a strongest predictor of intentions, but an interesting exception occurs in relation to eating a healthy diet (Barnard, Butshingi, Clacherty et al, 2013). With regard to healthy diet, one should eat plenty of fruit and vegetable, low-fat food and also products full of high-fibre.

The promotion of a healthy lifestyle and healthy eating practices from childhood is an issue of social, health and economic significance. Unhealthy diet has become increasing concerns in the South Africa and the world at large. It has been reported that "Approximately one in five children in South Africa is overweight, they do not eat healthy and they eat fried food, chips and cold drinks" (Holliday, Batey, Eves & Blannin, 2014). This exacerbates overweight and other related diseases among children. This kind of lifestyle, coupled with lack of exercise, has long-term health implications and can also have adverse effects as they become adults. With the vast advancements of the modern world, food is developed in ways that are cheaper for consumers but cause the food to contain high amounts of saturated fat and cholesterol, which affect both males and females (Armstrong, Lambert & Sharwood, 2006).

Armstrong et al (2006) found that 22% of girls and 17% of boys aged 6-13 years were overweight or obese; and 18% of children aged 1-9 years were stunted and 10% were underweight. One of the studies on urban 18-year olds and older conducted in Limpopo Province, discovered that there was a gap between nutrition knowledge and healthy practices among both Blacks and Whites (Audain, Carr, Dikmen, Zotor & Ellahi, 2017). However, there is little documented research that has explored good practices on healthy diet within rural schools in Limpopo Province.

Few studies have reported on children's health practices and their relationship to obesity South African children. This leaves a gap in the practices towards healthy eating. Such studies may provide precise estimates of the rate of change in curbing the prevalence NCDs among children if good practices are maintained. So far, we do not know what children's practices are regarding healthy diet in this target population (Dikgale). The gap widens even broader when it comes to primary school children between the ages of 10-14 years. For this reason, this study seeks to explore and describe the practices of primary school children towards healthy diet in Limpopo Province.

METHODOLOGY

This qualitative study used and exploratory case study design to explore primary school children constrains and challenges in practicing healthy diet. The study was conducted in seven primary schools at Dikgale village in Capricorn South District, South Africa. Purposive sampling was used to sample Grade 6 and 7 learners in Dikgale Village. The reason for this population is that learners in these Grades have already been taught about healthy diet, diseases and conditions related to diet from subjects like Natural Sciences and Life Skills in the previous years of Grades 4 and 5. Sample for this study consisted of 56 boys and girls from these primary schools. Data was collected through focus group interviews in the seven primary schools. Through focus group interviews, researchers gained multiple perspectives in an interactive group setting of both Grades 6 and 7 learners. The researcher chose focus-group interviews because discussions with participants would be comfortable and enjoyable for participants as they would be sharing ideas. Focus groups consisted of eight learners per school in both Grade 6 and 7 learners. Each Grade was represented by two boys and two girls as clarified in sampling procedure, that is, stratified random sampling. All interviews were audio-recorded and notes were also be taken. The focus group interviews were conducted to understand learners' ways of making meaning together with peers in a primary school setting (Søndergaard, 2005).

RESULTS

Results from these are hereby presented according to the following themes that emerged from this study. The themes are presented as follows:

The Impact of SAFBDG on Practicing Healthy Diet

The South African Food Based Dietary Guidelines provides guidance on the type of food people must eat. This emphasize the issue of knowledge on healthy diet. According to the SAFBDG, key to optimal nutrition and health of an individual is an adequate diet that must include a variety of foods in moderation (Smitasiri & Uauy, 2007). When learners were asked if they were aware of the SAFBDG, the majority of them had no idea what this is. L2B said: "I became aware of that word when you taught us about healthy diet in class".

This was supported by L8B who said:"I have never heard about that word before, I only heard it from your lessons".

These sentiments were also shared by participants from other sampled schools. L3E indicated that they were not taught about SAFBDG before the intervention by saying, "My teacher never taught us about guidelines before, but now I know it's important to eat according to the guidelines". L4B-"The food guidelines guides on the type of food we should eat, for example, we must eat fruits and vegetables everyday".

When a follow up question was asked whether they think they eat at home or school is according to SAFBDG, participants had mixed feelings. For example, in School C, learners said it is difficult to follow all the guidelines. Following are some of the responses:

L7C: "I want to follow food guidelines so that I can be healthy, but I eat what my parents cook. However, I think that the food we eat at school is okay."

One learner even suggested that for him it would not be difficult to follow SAFBDG by saying:

L1C: "I think I will be able to follow the guidelines because my mother sells bananas, tomatoes and 'morogo'. So I will tell her that she is selling healthy food".

L4F: "it is difficult to difficult to eat according to food guidelines at home. At school, we eat fish, samp, cabbage, and milk. We also served a fruit once a week".

Challenges to Adhere to Good Health Practices (SES)

When children were asked why they did not follow SAFBDG to stay healthy, the majority of them indicated that they eat what is provided by their families. It was clear that even if they wanted to eat healthy, they have no choice but to eat what they are provided by their parents. In School B, for example, L4B said: "I know that my diet must contain healthy food, however, my parents cannot afford to buy vegetables because they do not work".

This was supported by L1B who said: "After you taught us about dietary guidelines, I know it's important for our diet to consist of food from all the food group, but I only eat what is cooked at home".

L2D added by saying

"I think it is important to eat healthy food, but if there is no one working at home, it is difficult to eat healthy food".

Not following good healthy practices might be related to the kind of food children find from their homes and the type of food they are exposed to in their environment. Some participants asked me if 'morogo' was healthy, for example L5A said: "I eat 'morogo' at home instead of vegetables. Is 'morogo' healthy?"

One participant quickly responded and said, L2B: "Yes 'morogo' is a vegetable that means it is healthy".

However, other participants argued that 'morogo' is not healthy. For example, L8B said:

"I don't think 'morogo' is healthy but cabbage is 'morogo' that is healthy".

Participants were asked if they eat breakfast before coming to school. The majority of them indicated that they did not eat until lunch time at school. In School E, for example, participants said:

L1E: "I do not eat breakfast because I will be late to school."

L6E: "There is sometimes no bread, so I do not eat breakfast every day."

When asked if they could change the type of food they eat to a healthy diet, participants indicated that they can change to the diet suggested by SAFBDG. Here are some of the responses.

L8D: "Because I don't want to get sick when I grow up, if I was able to make a choice, I would choose healthy food only.

L3B: "I want to eat healthy, so if I had a choice, I would choose food according to the guidelines.

Taste Preference Rather than Nutritional Value

Participants in this study preferred taste than nutritional value. When they were asked whether they eat food because is healthy or its nutritional value, most participants preferred taste. The following are some of the responses:

L6A: "I eat food because of its taste, if the taste is awful, I cannot eat it. My aunt bought frozen vegetables one day and I only ate carrot. I did not like broccoli and some white stuff".

L3E: "When I eat food I like the taste. If the taste is bad, I cannot eat. For example, I don't like green beans.

L1E: "I like green beans and the beans they feed us at school. I also like beetroots and butternut.

L5E: "We eat butternut and cabbage at school".

Participants indicated that even though they preferred tasty food, they can now differentiate between healthy food and unhealthy food regardless of taste. For example,

L8F: "I know I have to eat healthy food regardless of taste. Tasty food is not always healthy".

L5A: "Even if there is food that I don't like because of taste, I know they are healthy, for example, I don't like carrots but I know it's healthy".

School Vendors and Tuck Shop Promoting Unhealthy Diet

Participants in this study indicated that tuck-shops and vendors who sell food in and outside the schoolyards during breaks, they do not sell healthy food. The following are some of the responses from participants:

L7E: "According to me, the mamas (vendors) do not sell healthy food because they sell sweets, mashwamshwam and magwenya (fatcakes).

L2E: "They also sell sephatlo (bunnychow) and coldrink".

L4D: "They don't sell healthy food at all. They know that children like sweet things that is why they sell sweets and biscuit".

Only one schools had a tuck-shop within the school premises. The other five had a spaza-shop nearer to the school where learners are allowed to buy during break. When learners were asked if the tuck-shop/spaza-shop sold healthy food, majority indicated that they sell almost the same food as the school vendors.

L2F: "They sell the same food as the mamas from the school, but they are cheaper than mamas".

L6A: "I think their food is not healthy because they sell sweets, biscuits and magwenya".

L3A quickly intercepted and said

"Even sephatlo." It was quite interesting to hear some participants indicating that some spaza-shop sell bananas and avocado. But what became intriguing was that, even if learners did not buy them, their teachers always send them to buy for them. Here are some responses:

L4E: "My teacher always send me to buy avocado and atchaar (pickled mango with spices), but sometimes I buy her bananas".

L8B: "Our teachers sometimes send us to buy atchaar, bread or sephatlo at the tuck-shop."

L1B added thus: "Don't forget that we also buy for them cold drink."

DISCUSSION

This study explored primary school children constrains towards practicing healthy diet in Limpopo Province. The results revealed that even though the National School Nutrition Programme provides healthy food for learners, vendors still sell unhealthy food which makes it difficult for student to practice proper healthy diet. These findings are consistent with that of Kupolati, Gericke & MacIntyre (2015) who discovered that support for school with regard to nutrition education was inadequate. This weakens the capacity of school nutrition education to encourage healthy eating behaviours on learners.

In previous studies (Hardikar, Höchenberger, Villringer & Ohla, 2017); (Bekele, Beuving & Ruben, 2016) it has been indicated that taste has been associated with obesity as one of the factors governing food intake. This is not different from this study. Children preferred taste rather that nutritional value. Although children knew that food such as fried chips, bunny-chow and fat-cakes contain a high amount of saturated fat and cholesterol, these foods were highly consumed by children and this reflects food preference rather than nutritional value. The fact that children preferred taste rather than nutritional value, suggests that knowledge alone is not enough to follow healthier diet. Like Ajzen (2015) has suggested, every behaviour encompasses a choice, even if the choice is only between performing that particular behaviour and not performing it. It is clear in this study that the choice of consuming unhealthy food is sometimes related to food preference of which it amounts to bad practices because nutritional value is ignored.

Feasting on fried food was found to be high (76%), particularly among girls. This is despite the fact that they were aware that fried food can make a person fat. This finding suggest that primary school children might know about the bad practice of consuming fried food like fat-cakes and bunny-chow. Fried food could be seen everywhere since these kind of foods is tasty, fill the stomach and not much expensive (Aung, Foung, Azman, Ain & Zulkifeli, 2012). This suggests that even though they have sufficient knowledge regarding healthy food, they found it hard to follow the recommended type of food to be consumed like fruits and vegetables. Thus, children need further education, not only on healthy eating, but also on effects of unhealthy eating.

Based on what learners are fed from the NSNP, it can be inferred that, to a certain extent, the Integrated School Health Programme (ISHP) was adhered by the schools and this is considered as an important tool to promote a healthy eating environment. Learners indicated that the school feed with porridge, rice and samp as sources of carbohydrates, beans and milk as sources of proteins, fruits and vegetables as sources of vitamins and minerals. One strategy to improve proper health practices among children is to provide better access to nutritious food at schools. Evidence supports the notion that school-lunch programmes improve diet quality and food security among children, especially those of low SES (Egner, Oza-Frank, Cunningham, 2014). This selective approach can efficiently reach populations in need but it may also run the risk of stigmatizing children of low SES among their peers, particularly those from well to do families. However, the challenge that arises is that, the very same schools allows vendors and tuck-shop operators to sell unhealthy food such as bunny-chow (sephatlo), chips, sweets, and fat-cakes (magwenya) within the school premises. This undermines the policy on ISHP which stipulates healthy items that can be sold to learners. It is important for learners to be taught about healthy eating habits at an early age, thus defining the purpose of implementing the ISHP at primary schools (Gourdet, Chriqui, Piekarz, Dang & Chaloupka, 2014).

Not much was done by schools to emphasise the importance of adhering to SAFBDG, which is part of the ISHP. Even though Grade 5 curriculum in both Life Skills and Natural Sciences indicate that learners have to be taught about dietary guidelines (SAFBDG), learners in this study were not taught about this concept until this intervention. These results are considered alarming because all participants have passed Grade 5 but had never been taught about the guidelines. This is the failure of the school SMTs to clarify the importance of SAFBDG and ISHP and ensure that all concepts in the curriculum are taught. Failing to implement and teach learners about the health guidelines in schools deprives children in advancing proper health practices. Basch (2010) and Yamaguchi, Kondo and Hashimoto (2018) indicated that in accordance to scientific reviews schools that conduct the health programmes can create a positive effect on children's educational outcomes and health outcomes. Not teaching primary school children about SAFBDG and ISHP could be one of the contributing factors of limited knowledge on health issues and probably poor performance.

Households are unable to provide healthy food for children because of socio-economic status of families. Socio-economic status of these children predicted what is consumed in households. The most common food that was eaten seven days in a week was porridge and morogo. Just like in Oldewage-Theron and Egal (2010) study, the current study confirms that porridge is the staple food consumed by most black communities since it was consumed daily. According to Temple, Steyn, Myburg & Nel (2006), most South Africans consume mainly maize (which when cooked makes porridge), and bread. Fat intake was high, and did not significantly decrease even after intervention. One of the most common sources of fat was bunny-chow and fat-cakes which participants reported consuming them at least five times per week. Furthermore, about 67% (n=109) ate a fruit once a week. This is much less than the recommendations of five or more per day established by the Department of Health and Department of Basic Education (2012). Although it is not certain where they get the fruit from, it is likely that the fruit is served from the school nutrition programme. However, schools cannot be the only environment that advances the consumption of fruit. Children

cannot be blamed for not eating fruits daily because they eat whatever is provided for by their families. Even if families do not adhere to food guidelines, schools play a very important role in advancing healthy diet.

Findings that dietary practices among children were characterized by more consumption of fatty and sugary foods from vendors and tuck-shops in schools is an indication of unhealthy food choices. This study is in agreement with other studies which found that young children from developing countries are increasingly making unhealthy food choices especially due to lack of knowledge and negative attitude (Jain Yadav, Singh & Chamoli, 2018); (Tonkin, Kemps, Prichard, Polivy, Herman, Tiggemann (). Previously, over consumption of sweetened drinks/beverages was a trend observed among American population (Parmar, 2014). However, current studies indicate increased feasting of fatty foods among children in developing countries, with increased consumption of sugary beverages (Popkin & Hawkes, 2016); (Twarog, Peraj, Vaknin, Russo, Woo-Baidal, Sonneville, 2019), which contribute to a greater number of total caloric intake and directly to obesity epidemic.

Participants in this study indicated that they did not eat breakfast. Some indicated that they did not eat because they would be late to school while other did not have anything to eat for breakfast. These findings are consistent with those by Mihrshahi, Drayton, Bauman and Hardy (2019) who found that many children do not have breakfast daily. This is despite recent data from the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE), which demonstrated that more frequent breakfast consumption was associated with lower BMI z-scores and body fat percentage compared with occasional and rare consumption (Zakrzewski, Gillison, Cumming, Church et al, 2015). It is suggested that the protective effect of eating breakfast is that it may reduce snacking and consumption of energy-dense nutrient-poor foods later in the day which may increase obesity (Timlin, Pereira, Story & Neumark-Sztainer, 2008). Skipping breakfast may also have long-term effects. It was found in the Australian longitudinal study by Smith, Gall, McNaughton, Blizzard, Dwyer and Venn (2010) that children age 9-15 years who reported skipping breakfast in both childhood and adulthood had larger waist circumferences, higher BMI, and poorer cardio-metabolic profiles than did those who reported eating breakfast at both time points.

CONCLUSION

Lack of collaboration between school authorities, vendors/tuck shops and households makes it difficult for children to adhere to good health practices. Even if the schools can feed learners healthy food through NSNP, it is fruitless for schools to allow vendors and tuck shop owners to sell unhealthy food to learners. A policy on Integrated School Health Programme program should be adhered to the latter because it also indicates the type of food vendors and tuck shop owners should sell to students in schools as per SAFBDG. This policy indicate that the vendors and tuck shop owners should sign the Service Level Agreement which stipulates what should be sold through the SGB and the SMT.

It is somehow difficult for children to maintain good healthy practices in their households because of unemployment and poverty in this rural village. The SAFBDG should be used as a nutrition tool for schools and communities so that good health practices on healthy food can be maintained.

Furthermore, the Departmesnt of Health and Department of Agriculture should involve families in growing their crops by providing crops (carrots, spinach and other vegetables suitable for Dikgale community) and skills to maintain such crops. This may assist children to consume healthy vegetables grown in their household gardens.

REFERENCE

1. Ajzen,I.Consumer attitudes and behaviour The theory of planned behavior applied to food consumption decisions Rivista di Economia Agraria. 2015; 1 70(2):121-38.
2. Armstrong, M.E.G,Lambert, M.I,Sharwood K.A. Obesity and Overweight in South African Primary Schoolchildren – the Health of the Nation Study South African Medical Journal. 2006; 96, 439-444.
3. Audain, K, Carr, M, Dikmen, D, Zotor, F,Ellahi, B. Exploring the Health Status of Older Persons in Sub-Saharan Africa. Proceedings of the Nutrition Society.2017; 76(4):574-579.
4. Aung, P.P., Foung, C.S., Azman, K.B., Ain, N,Zulkifeli, B. Knowledge Attitude and Practice of Healthy Eating among the 1st And 2nd Year Students of University Malaysia Sarawak (UNIMAS). 2012; 39,188-194).
5. Barnard, J, Butshingi, S, Clacherty, A, Clitheroe, F, Dada, F, & Doubell, S. Day-by-Day Natural Sciences and Technology Grade 6 Johannesburg Maskew Miller Longman. 2013.
6. Basch, C.E. Healthier Students Are Better Learners A Missing Link in School Reforms to Close the Achievement Gap Equity Matters Research Review Campaign for Educational Equity Teachers College Columbia University.2010.
7. Bekele, A.D., Beuving, J. & Ruben, R. Food choices in Ethiopia does nutritional information matter International journal of consumer studies. 2016 40(6):625-34.
8. Boddy, L.M,Knowles, Z.R, Davies,I.G,Warburton,G.L,Mackintosh,K.A,Houghton, Fairclough, S.J.Using Formative Research to Develop the Healthy Eating Component of the Change School-based curriculum intervention BMC Public Health.2012; 12(1): 710.
9. Conner,M,Norman, P.Bell, R.The Theory of Planned Behaviour and Healthy Eating Health Psychology.2002; 21(2): 194-201.
10. Egner, R,Oza-Frank, R.Cunningham, S.A.The School Breakfast Program: A view of the present and preparing for the future a commentary The Journal of school health, 84(7), 417.
11. Flynn, M.A.T, McNeil, D.A, Maloff, B, Mutasingwa, D.M, Wu, M, Ford, C. et al. Reducing obesity and related chronic disease risk in children and youth a synthesis of evidence with 'best practice' recommendations. 2006 ;1:7-66.

12. Gourdet, C.K,Chriqui, J.F, Piekarz, E, Dang, Q. Chaloupka F.J.Carrots and Sticks Compliance provisions in state competitive food laws-Examples for state and local implementation of the updated USDA standards Journal of School Health 2014; 84 (7), 466-471.
13. Hardikar, S., Höchenberger, R., Villringer, A. & Ohla, K. Higher sensitivity to sweet and salty taste in obese compared to lean individuals. Appetite.2017 ;111:158-65.
14. Holliday, A., Batey, C., Eves, F. F., & Blannin, A. K. . A novel tool to predict food intake: the visual meal creator. Appetite,2014; 79, 68-75.
15. Jain, M., Yadav, D., Singh, V.C. & Chamoli, R. Nutritional Status and Diet Quality in 7-10 Years Old School Going Children. ESSENCE Int. J. Env. Rehab. Conserv,2018; 9 (1), 45-53.
16. Kupolati, M.D., Gericke, G.J. MacIntyre, U.E.Teachers' perceptions of school nutrition education's influence on eating behaviours of learners in the Bronkhorstspruit District South African Journal of Education. 2015; 35(2): 1049.
17. Kyallo, F, Makokha, A. Mwangi, A.M. Overweight and Obesity among Public and Private Primary School Children in Nairobi Kenya Health.2013 5: 85-90.
18. Mihrshahi, S, Drayton, B.A, Bauman, A.E. Hardy,L.L.Associations between Childhood Overweight, Obesity Abdominal Obesity and Obesogenic Behaviors and Practices in Australian Homes BMC Public Health.2019 ; 18(1), 44.
19. Muthuri, S.K, Francis, C.E,Wachira, L.J.M,LeBlanc, A.G,Samson, M,Onywera, V.O. et al. Evidence of an overweight/obesity transition among school aged children and youth in Sub SaharanAfricaasystematic review PLoSOne.2014; 9(3):e92846.
20. Oldewage-Theron, W.H. & Egal, A.A. Nutrition Knowledge and Nutritional Status of Primary School Children in QwaQwa. South African Journal of Clinical Nutrition. 2010; 23(3).
21. Parmar, J.K. (2014). Sugar-sweetened Beverages and Their Relationship to Obesity in South Asian Children Doctoral dissertation, Science. 2014.
22. Popkin, B.M. & Hawkes C. Sweetening of the Global Diet, Particularly Beverages: Patterns, trends and policy responses The Lancet Diabetes Endocrinology.2016; 4(2),174-186.
23. Prelip, M. Kinsler, J, Le-Thai, C,Erausquin, J.T. Slusser, W. Evaluation of a school-based multicomponent nutrition education program to improve young children's fruit and vegetable consumption Journal of nutrition education and behaviour. 2012; 44(4), 310-318.
24. Smitasiri, S. & Uauy, R. (2007). Beyond Recommendations: Implementing food-based dietary guidelines for healthier populations. Food and nutrition bulletin, 28(1_suppl1), 2007 141-S151.
25. Smith, K.J., Gall, S.L., McNaughton, S.A. et al. Skipping Breakfast: Longitudinal associations with cardiometabolic risk factors in the Childhood Determinants of Adult Health Study The American journal of clinical nutrition. 2010 92(6), 1316-1325.
26. Steyn, N.P., Lambert, E.V., Parker, W., Mchiza, Z. & De Villiers, A.A Review of School Nutrition Interventions Globally as an Evidence Base for the Development of the Health-Kick Programme in the Western Cape, South Africa. South African Journal of Clinical Nutrition,2015;22(3), 145-152.
27. Temple, N.J, Steyn, N.P, Myburg, N.G,Nel, J.H. An Evaluation of Food Consumed in Schools in Cape Town, South Africa. Nutrition.2006 22:252–8.
28. Timlin, M.T., Pereira, M.A, Story, M. & Neumark-Sztainer, D. Breakfast Eating and Weight Change in a 5-Year Prospective Analysis of Adolescents Project EAT (Eating among Teens) Paediatrics. 2008; 121(3).
29. Tonkin, M., Kemps, E., Prichard, I., Polivy, J., Herman, C.P. Tiggemann, M .It's all in the timing: The effect of a healthy food cue on food choices from a pictorial menu. Appetite. 2019 ;139:105-9.
30. Twarog, J.P, Peraj, E, Vaknin, O.S,Russo, A.T, Woo-Baidal, J.A.Sonneville, K.R. Consumption of sugar-sweetened beverages and obesity in SNAP-eligible children and adolescents Primary care diabetes. 2019.
31. World Health Organisation World Health Organization Diet Nutrition and the prevention of Chronic Disease.2013
32. Yamaguchi, M., Kondo, N. Hashimoto H.Universal School Lunch Programme Closes a Socioeconomic Gap in Fruit and Vegetable Intakes among School Children in Japan The European Journal of Public Health.2018; 28(4), 636-641.
33. Zaborskis, A., Lagunaite, R., Busha, R. Lubiene, J.Trend in Eating Habits Among Lithuanian School-Aged Children in Context of Social Inequality Three cross-sectional surveys. 201212(1), 52.
34. Zakrzewski, J.K, Gillison, F.B, Cumming, S,Church, T.S. et al. Associations between Breakfast Frequency and Adiposity Indicators in Children from 12 Countries. International Journal of Obesity Supplements,2015 ; 5(2),80.