

Response to sugar letter

Dear Prof Evans

I am writing in response to the letter by Naidoo and Sheiham printed in the September 2014 issue of this Journal. There are two issues, the first being SASA's commitment to evidence based nutrition education and the other pertaining to the issue of sugar and dental caries.

The letter suggests that SASA is not concerned about improving public health nor to be trusted as custodians of nutrition information. SASA finds this most offensive as it is categorically not true. Here with the facts which clearly illustrate the credibility of SASA and in particular the Nutrition Department that is responsible for disseminating information.

1. SASA's Nutrition Department only employs Dieticians who are registered with the Health Professions Council of South Africa and who uphold and adhere to the code of ethics and conduct.

2. SASA's Nutrition Department has been established for more than 35 years and has communicated science based information on sugar and health in line with the South African dietary guidelines.
3. SASA's Nutrition Department's material is used by the Department of Health, organisations such as Diabetes South Africa, and a wide cross section of respected health professionals including dieticians and nutritionists.
4. SASA's Nutrition material has been widely distributed at respected conferences without complaint for many years, such as Association Dietetics South Africa.
5. SASA's Nutrition Department Dieticians are all members of the Association of Dietetics South Africa and the Nutrition Society.
6. Over the last 35 years, SASA has funded research that has contributed to the understanding of unique nutrition challenges faced in South Africa. Projects funded were selected by a panel of internationally recognised and respected scientists independent of SASA. A significant proportion of funding went to oral health.
7. SASA has committed extensive funding and resources to improving the health profile of all South Africans through numerous education programs, distribution of material, workshops, funding of training such as at nursing colleges.
8. SASA has significantly invested in capacity building by empowering health professionals from community health workers and nurses to workers in the primary education sector

Contribution to research and improving public health for several decades

There is ample evidence of SASA's

with nutrition education. Nutrition Education workshops are conducted at no cost to delegates and in collaboration with provincial departments of health and education.

Workshops have been conducted in rural and deep rural areas where the demand for nutrition education is greatest.

9. Registered dieticians facilitate training on various topics including diabetes, weight management and HIV and AIDS. Delegates are appreciative of the skills gained in the education sessions. The content of workshops is based on the Department of Health's food based dietary guidelines. These guidelines are evidence based and specifically developed for the South African population.
10. SASA's Nutrition Department's information is not irresponsible, nor marketing of sugar. Information leaflets are on diabetes, HIV, weight management, hypertension, oral health and healthy eating for adults and children are provided free of charge to health professionals.

All are independently written and contain accurate information on sugar. Support is also given to organisations involved in training diabetes educators such as DESSA (Diabetes Education Society of South Africa) and DSA (Diabetes South Africa).

Dental caries

The most substantial reduction in dental caries during the past 40 years

occurred following the introduction of fluoridated water or toothpaste and improved oral hygiene (Kandelman, 1997, Konig, 1990).

Trends in caries reduction in industrialised countries have occurred not only independent of sugar intake, but also whilst sugar consumption has stayed relatively constant (Downer, 1994, Konig, 1990). Population data show no relationship between changes in sugar supply and changes in caries prevalence (Ruxton *et al.*, 1999). Furthermore, the evidence does not support the proposition that even total removal of sugars from the diet would eliminate caries (Konig, 1990, Woodward and Walker, 1994). This is explicable in the light of the evidence that all fermentable carbohydrates, including the staple food cooked starch, is acidogenic in the presence of saliva and certain oral bacterial populations.

A 5-year study in Sweden (Gustaffson *et al.*, 1954) showed no influence of the amount of sugar consumed when 340 g per day was given only at meal times to subjects with no access to fluoride and no oral hygiene. Free living individuals today are unlikely to consume such huge amounts of sugar and many will have the protection of both oral hygiene and access to fluoride.

Frequent consumption of fermentable carbohydrates, including sucrose, has a role in the aetiology of dental caries. However, this role is substantially reduced when oral hygiene with use of

fluoride toothpaste is adequate. Efforts to prevent dental caries should focus on achieving adequate oral hygiene practices with fluoride toothpaste as this has proven to provide a much greater reduction in caries experience than dietary modification. Dietary advice for the reduction of dental caries risk should focus on limiting the frequency of exposure to all fermentable carbohydrates.

Kind regards

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References

1. Downer, M. C. (1994) Caries prevalence in the United Kingdom. *Int Dent J*, 44, 365- 70.
2. Gustaffson, B. E., Quensel, C.-E., Swenander, L. L., *et al.* (1954) The Vipeholm Dental Caries Study. The effects of different levels of carbohydrate intake in 436 individuals observed for five years. *Acta Odontol Scand*, 11, 232-364.
3. Kandelman, D. (1997) Sugar, alternative sweeteners and meal frequency in relation to caries prevention: new perspectives. *Br J Nutr*, 77 Suppl 1, S121-8.
4. Konig, K. G. (1990) Changes in the prevalence of dental caries: how much can be attributed to diet? *Caries Res*, 24, 16-18.
5. Ruxton, C. H., Garceau, F. J. & Cottrell, R. C. (1999) Guidelines for sugar consumption in Europe: is a quantitative approach justified? *Eur J Clin Nutr*, 53, 503-13.
6. Woodward, M. & Walker, A. R. (1994) Sugar consumption and dental caries: evidence from 90 countries. *Br Dent J*, 176, 297-302.

Reply to SASA

Dear Professor Evans,

We are pleased to hear that the South African Sugar Association (SASA) is committed to evidence-based nutrition. They should therefore base their policies and education programmes on the most thorough reviews of the scientific literature on sugars. So let's look at what those rigorous systematic reviews conclude.

Recently, the WHO Nutrition Guidance Expert Advisory Group (NUGAG) commissioned two extensive reviews

of the scientific literature, one on dietary sugars and body weight and the other on sugars and dental caries (Te Morenga, Mallard & Mann 2013; Moynihan & Kelly 2014). The systematic review on dietary sugars and body weight accessed 17,340 studies and found that "the meta-analyses based on controlled trials provide consistent evidence that increasing or decreasing intake of dietary sugars from current levels of intake is associated with corresponding changes in body weight in adults." Te Morenga, Mallard & Mann (2013) concluded that "Among free liv-

ing people involving ad libitum diets, intake of free sugars or sugar sweetened beverages is a determinant of body weight."

The systematic reviews of the literature by Te Morenga, Mallard and Mann (2013) and by Malik *et al.* (2013) confirm the link between increased intake of free sugars, particularly in the form of sugar-sweetened beverages and unhealthy weight gain in both children and adults. And reducing consumption of sugar-sweetened beverages has been shown to reduce weight

gain in children, particularly in those who are already overweight (Malik *et al.* 2013). Further evidence shows that interventions to reduce consumption of sugar-sweetened beverages significantly decreased weight gain in children and adolescents (de Ruyter *et al.* 2012; Ebbeling *et al.* 2012). de Ruyter *et al.* (2012) found that a reduction of 104 kcal from sugar-sweetened beverages per day (about 70% of a standard 330ml portion) was associated with 1.01 kg less weight gain over 1.5 years among normal weight children.

The weight of evidence on sugars and overweight has been sufficient for many scientific associations and expert bodies to recommend the reduction in free sugars intake. These include the American Medical Association, the US Institute of Medicine of the National Academies, and the US Centers for Disease Control, as well as the World Health Organisation's expert reports. If SASA is committed to evidence based nutrition they should change their policies and guidance on sugars and obesity. In our previous rejoinder to SASA we said that SASA misquotes WHO as stating that the link between sugar and body weight is due to overconsumption of calories and not specific to sugars. However, here is WHO's categorical statement: "Increasing or decreasing dietary sugars is associated with parallel changes in body weight."

As regards dental caries, the overwhelming evidence on the role of sugars indicates that the data being used by the SASA is outdated. In the most extensive systematic review ever conducted on the 'Effect on Caries of Restricting Sugars Intake', Moynihan and Kelly (2014) found a consistent association between higher dental caries with higher sugars intake. Moreover, they found that the consistent association even when accounting for fluoride exposure. When analysing data on the annual per capita sugars <10 kg/person/yr (~5% E) vs. >10 kg they reported that there was a log-linear relationship between dental caries increment and sugar intakes. That indicates that with every kilogram increase in sugars there is a proportionate increase in caries. The correlation between sugar and dental caries was as high as $r=+0.8$ in the lower first permanent molars.

On the basis of the reviews the WHO's NUGAG issued guidance on sugars and obesity and tooth decay, and concluded that: "There is increasing concern that consumption of free

sugars – particularly in the form of sugar-sweetened beverages – that increases overall energy intake and may reduce the intake of foods containing more nutritionally adequate calories, leading to an unhealthy diet, weight gain and increased risk of Non Communicable Diseases (NCDs)." On the basis of their analysis NUGAG recommended that there should be a reduced intake of free sugars throughout life in all countries. In both adults and children, they recommend that intake of free sugars should not exceed 10% of total energy and a further reduction to below 5% of total energy. Their recommendations are echoed by the Director General of the WHO, Dr Margaret Chan. Dr Chan views obesity as the tip of the iceberg, and fears there will be a catastrophe in which governments throughout the world will have to cope with managing millions suffering from long-term chronic illness. In her presentation to the 67th World Health Assembly she said: "Highly processed foods and beverages loaded with sugar are ubiquitous, convenient, and cheap. Childhood obesity is a growing problem with especially high costs."

It appears from the submission by the SASA as a rejoinder to our article that they are not taking the findings of the WHO into account. In addition, their references to a paper by Ruxton *et al.* (1999) that concluded that there was no relationship between changes in sugar supply and changes in caries prevalence, shows that they are not taking into consideration the overwhelming evidence, based on hundreds of studies reviewed by Moynihan and Kelly (2014) that shows that Ruxton is wrong. Furthermore, the claim by the SASA that all fermentable carbohydrates, including cooked starches are cariogenic is incorrect as is their claim that adequate oral hygiene will prevent dental caries.

The relationship between diet and dental caries is summarized by Moynihan and Petersen (2004) in their review for an earlier WHO report on diet and chronic diseases. They concluded that "Despite improved trends in levels of dental caries in developed countries, dental caries remains prevalent and is increasing in some developing countries undergoing nutrition transition. There is convincing evidence, collectively from human intervention studies, epidemiological studies, animal studies and experimental studies, for an association between the amount and

frequency of free sugars intake and dental caries. Although other fermentable carbohydrates may not be totally blameless, epidemiological studies show that consumption of starchy staple foods and fresh fruit are associated with low levels of dental caries. Fluoride reduces caries risk but has not eliminated dental caries and many countries do not have adequate exposure to fluoride."

We hope that the SASA will update their reviews and thinking on this important subject and take into consideration the overwhelmingly convincing evidence that free sugars are the major cause of caries; the most common chronic disease in the world. Better oral hygiene and fluoride is not the solution to the caries problem.

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References

1. de Ruyter JC, Olthof MR, Seidell JC, Katan MB. (2012) A trial of sugar-free or sugar-sweetened beverages and body weight in children. *New England Journal of Medicine*. 367(15),1397-406.
2. Ebbeling CB, Feldman HA, Chomitz VR, Antonelli TA, Gortmaker SL, Osganian SK, Ludwig DS. (2012) A randomized trial of sugar-sweetened beverages and adolescent body weight. *New England Journal of Medicine*. 367(15),1407-1416.
3. Lobstein T. (2014) Reducing consumption of sugar-sweetened beverages to reduce the risk of childhood overweight and obesity. WHO e-Library of Evidence for Nutrition Actions (eLENA) September 2014. http://www.who.int/elenas/titles/commentary/ssbs_childhood_obesity/en/
4. Malik VS, Pan A, Willett WC, Hu FB. (2013) Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *American Journal of Clinical Nutrition*. 98(4),1084-1102.
5. Moynihan P, Kelly S. (2014) Effect on caries of restricting sugars intake: systematic review to update WHO guidelines. *J Dent Res* 93, 8-18.
6. Moynihan P, Petersen PE. (2004) Diet, nutrition and the prevention of dental diseases. *Public Health Nutrition* 7, 201-226.
7. Ruxton CH, Garceau FJ, Cottrell RC. (1999) Guidelines for sugar consumption in Europe: is a quantitative approach justified? *Eur J Clin Nutr* 53: 503-513.
8. Te Morenga L, Mallard S, Mann J. (2013) Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies. *BMJ* 346:e7492.