

## ENJOY A VARIETY OF FOODS — DIFFICULT BUT NECESSARY IN DEVELOPING COUNTRIES

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'Enjoy a variety of foods' is the first of the ten South African Food-Based Dietary Guidelines (FBDGs). This guideline attempts to focus on some of the consequences arising from a lack of dietary variety. Its aim is to encourage people to change their diets where necessary so as to increase the variety of foods eaten and to enjoy their food. The guideline needs to be understood in the context of the other FBDGs and to be applied with the assistance of appropriate food guides.

For both consumers and nutritional scientists, variety is conceptualised as including different foods and different food groups as part of the diet, as well as altering the method of food preparation. In addition, for the consumer, variety is important in order for the taste preferences of the household to be accommodated as well as ensuring that the family enjoys their food.

Prevalent low micronutrient intakes and low energy intakes, as well as overconsumption of food with the associated increased risk for chronic diseases of lifestyle, are addressed.

There are, however, a number of potential problems which may arise from this guideline. The high levels of household food insecurity in South Africa will be a constraint on the implementation of this guideline. Increasing dietary variety could be interpreted as increasing the number of processed foods of low micronutrient and phytochemical content, particularly in the urban context. Obesity is a problem for some sections of the population in South Africa and increasing dietary diversity could lead to increased energy intakes and obesity. Therefore, formulation of appropriate food guides and other measures are important to address these problems and to ensure that increasing dietary variety leads to increased intakes of appropriate foods that are good sources of micronutrients. The challenge is to ensure that these goals are achieved within the context of high household food insecurity and increasing urbanisation.

There are several diet-related public health concerns in South Africa. Food-Based Dietary Guidelines (FBDGs) have been proposed to attempt to resolve many of these public health problems.<sup>1</sup> As outlined in the introductory paper<sup>1</sup> South Africa is a society in transition with a double burden of diseases related to both under- and overnutrition. Poorer populations have problems of stunting, micronutrient deficiencies and a greater risk of infectious disease, while both richer and poorer populations are more prone to obesity and chronic degenerative diseases.

'Enjoy a variety of foods' is the first of the ten FBDGs. This guideline attempts to focus on some of the consequences arising from a lack of dietary variety. Results of the 1999 National Food Consumption Survey in South Africa showed that the diets of many households, particularly lower income households, have low dietary variety.<sup>2</sup> The aim of this guideline is to encourage people to change their diets where necessary so as to increase the variety of foods eaten and to enjoy their food. The guideline needs to be understood in the context of the other FBDGs and to be applied with the assistance of a food guide.

The aim of this paper is to discuss the rationale and scientific background for the recommendation to enjoy a variety of foods. It should be noted that the FBDGs are for children aged 5 years and older and for all 'healthy' South African adults (excluding pregnant and lactating women).

### CONCEPTUALISATION OF THE FBDG 'ENJOY A VARIETY OF FOODS'

#### Conceptualisation of dietary variety by nutritional scientists

Nutritional scientists are interested in quantifying and describing dietary variety because of possible relationships between dietary variety and the nutritional quality of the diet and between dietary variety and the health of people consuming the diet.

Dietary variety can be conceptualised and measured in a number of ways. The choice of index that is used to assess dietary variety is therefore important, since the use of different indices may lead to different conclusions regarding relationships with dietary variety. Two primary approaches have been used to create an index of dietary variety. The first is the calculation of a score based on the numbers of individual foods consumed. The second is to group foods into major and minor food groups, and derive a score based on the number of food groups consumed.<sup>3</sup> A key issue in determining the dietary variety score is determining which foods should count as the same or different items.<sup>4</sup>

Nutritional scientists argue that it is useful to examine the diets that people consume in terms of a global index of the variety of foods eaten. Human diets are complex. In addition to

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examining individual nutrients and other food constituents, there are many nutrient-nutrient interactions. Therefore, it is difficult to draw conclusions regarding the effects of a single food or nutrient on health outcomes.<sup>5</sup> Furthermore, our nutritional knowledge is incomplete, but expanding continuously, both in terms of nutrients and non-nutrients present in food that may impact on public health. Therefore, it is important to advocate the consumption of a variety of foods to ensure that there is a positive outcome on health, notwithstanding the limitations in our knowledge. In particular, it is important to ensure that the biodiversity of food sources is maintained and nutrient-dense foods are consumed.

### Conceptualisation of dietary variety by South African consumers

Focus-group discussions with Xhosa, Zulu, Afrikaans and English consumers in the KwaZulu-Natal and Western Cape provinces of South Africa, among urban (formal and informal) and rural populations, showed that dietary variety was conceptualised as including different foods and different food groups as part of the diet.<sup>6</sup> This was achieved both by varying the composition of foods used in each meal as well as varying the composition of meals from day to day. In addition, in households where there are few foods available, altering the method of food preparation was cited as a means of increasing dietary variety. All groups thought that the part of the guideline referring to variety was important in order for the taste preferences of the household to be accommodated, as well as ensuring that the family enjoyed their food and received the required nutrients.

These different interpretations of dietary variety can be viewed as complementary and as addressing differing specific public health problems.

The word 'enjoy' was understood as meaning to be satisfied or happy with and liking the food. It is interesting to note that in the situation of household food insecurity, focus-group participants talked about enjoying food in the sense of being lucky to have food. The focus-group participants also understood the term enjoy to refer to enjoying foods which fitted in with household taste preferences. In addition, it is interesting to note that household taste preferences could lead to the exclusion of certain foods.

### Reflections on the conceptualisation of dietary variety by nutritional scientists and by South African consumers

It would, therefore, appear that there is much commonality between the conceptualisation of dietary variety by nutritional scientists and by South African consumers. In this regard, both nutritional scientists and consumers conceptualised dietary variety as including different foods and different food groups

as part of the diet, as well as altering the method of food preparation. Nevertheless, nutritional scientists try to define dietary variety more precisely and quantitatively in order to enable them to formulate and test hypothesis regarding the relationship of foods, dietary quality and disease, whereas the consumer had a greater emphasis on the taste and enjoyment of food, which provides a useful background to the formulation of appropriate nutrition education.

### DIETARY DISORDERS OF PUBLIC HEALTH SIGNIFICANCE

A lack of dietary variety is thought to contribute to:

- low micronutrient intakes
- low energy intakes
- chronic diseases of lifestyle.

#### Low micronutrient intakes

Dietary diversification is one of the four main strategies advocated internationally for the improvement of micronutrient status in undernourished individuals.

A guideline on dietary variety has been substantiated in other countries on the basis of the need to consume more than 40 different essential nutrients. This is felt to be particularly important in relation to nutrients which are found only in a few foods such as vitamin A and its precursors, calcium, iron and vitamin C. When few such foods are consumed, intakes of these particular nutrients may be lacking.<sup>7</sup>

Data from the 1999 National Food Consumption Survey of children aged 1 - 9 years in South Africa,<sup>2</sup> showed that low income households had only a few foods present in the house, that few foods were consumed by the children and that low micronutrient intakes were widespread. The same survey showed that the average number of foods consumed in low income households nationally was 8 and varied from 4 in the Free State to 13 in the Western Cape, indicating a low dietary variety. The foods found most frequently in the household inventory of lower income households (< R12 000 per household per year) were maize, salt, white sugar, tea, fat/oils, white rice and white bread. These foods, together with brown bread and hard margarine, were the foods most frequently consumed by all children in the survey on the basis of the 24-hour recall (24 HR) method. All other foods listed (24 HR) such as chicken, beef, cabbage and squash, were consumed by less than a third of the sample, which is important in relation to the low micronutrient intakes reported in the survey. Therefore, there is a need for an increased intake of a variety of foods, e.g. fruits, vegetables, meat and legumes which will also contribute to improving micronutrient status.

Food consumption data from North America have shown that variety in food choices and dietary quality are related.<sup>8</sup> Simply including foods from each of the five major food

groups used in the USA (i.e. milk and milk products, grain products, fruits, vegetables, meat and meat alternatives) showed a correlation with the nutritional adequacy, measured as the mean adequacy ratio (MAR), an index of the percentage of recommended intake for eleven nutrients: protein, calcium, iron, magnesium, phosphorus, vitamin A, thiamin, riboflavin, and vitamins B<sub>6</sub>, B<sub>12</sub> and C. The authors suggest that the simplest approach to interpreting 'Enjoy a variety of foods' may be to include foods from each of the five food groups. The data also indicate that the addition of only one extra food item to a diet of poor dietary variety led to a significant increase in MAR, which was not the case when dietary variety was initially high.

A similar analysis of the South African National Food Consumption Survey data still needs to be done. However, given the low number of food items consumed in the diet from the different food groups, and the low reported micronutrient intakes, one can safely state that an increase in the variety of food from these food groups will be associated with improved micronutrient intakes in South Africa.

This important consideration should be borne in mind in view of the consumer's interpretation of increasing dietary variety by altering methods of food preparation. The latter will not improve the micronutrient intake of the diet where the diet consists of a few foods/few food groups and has a low micronutrient content.

### Low energy intakes

The National Food Consumption Survey<sup>2</sup> showed that there were widespread low energy intakes in children aged 1 - 9 years. The number of foods consumed by these children was also low.<sup>2</sup> Low energy intakes in developing countries have been ascribed to the lack of available food, and also type of foods available, e.g. the low fat content of many African diets.<sup>9</sup>

Low energy intakes could be increased by increasing the variety of foods eaten. Golden<sup>13</sup> has suggested that nutrients can be divided into types I and II and that deficient intakes of type II nutrients, e.g. zinc, are associated with anorexia. It can be postulated that a vicious cycle is set up when low dietary variety is associated with reduced energy and micronutrient intakes and a depression of appetite, further exacerbating the low energy intakes. Underwood<sup>10</sup> postulated that part of the cause of low energy intakes in developing countries is related to the monotony of the diet. This hypothesis was tested in a clinical study in Peru and the results cited by Brown *et al.*<sup>11</sup> show that in children fed two diets with a similar nutrient composition the energy intake was increased by 10% when the taste, colour and consistency of the diet was varied. This finding is in line with views expressed by the focus-group studies on consumers in South Africa, that altering the method of food preparation can also be used as a means of increasing dietary variety.<sup>6</sup>

Furthermore, two studies in adults, one in France<sup>4</sup> and one in the USA,<sup>12</sup> have shown an association between increased dietary variety and increased energy intake. The former study used a dietary diversity score based on the number of food groups consumed, while the second study used an index based on the number of different food items consumed within food groups.

### Chronic degenerative diseases

South Africa faces overnutrition-related chronic diseases of lifestyle such as hypertension, cardiovascular disease, non-insulin-dependent diabetes mellitus and cancer, which are prevalent in all population groups.

The observed relationships between diet and chronic diseases of lifestyle have been investigated. Many studies have shown that diets high in fruits and vegetables and low in meats and fats are protective against the development of chronic diseases of lifestyle. It is most unfortunate, however, that although the relationship shown is based on the consumption of specific foods, both scientists and public health professionals tend to trivialise the importance of wholesome foods by concentrating on the individual components of the diet and their chemical nature.<sup>14</sup> In terms of nutrition of the public and also in terms of scientific understanding, working with foods rather than any one of their components has much to be recommended. In this regard Wahlqvist and Specht<sup>15</sup> have shown that the food pattern most protective against disease is one of food diversity, which is defined as using probably 20 - 30 biologically distinct foods in a week.

Several investigators have studied the relationship between dietary diversity (measured as an index based on food or food groups) and disease outcome<sup>3</sup> and many but not all have found an inverse relationship between increased dietary diversity and mortality (all cause), cancer and cardiovascular disease.

A recent analysis by Kant *et al.*<sup>5</sup> found an inverse correlation between the Recommended Food Score and all cause mortality in American adults. The Recommended Food Score is the score derived by comparing the number of foods reported to be eaten at least once a week with those recommended by current dietary guidelines, i.e. fruits, vegetables, whole grains, low fat dairy products and lean meats and poultry. The conceptual framework for the food score is therefore broader than using a dietary variety score which only counts the number of foods, as suggested by Drewnowski *et al.*<sup>4</sup>

It would seem that in relation to the prevention of chronic diseases of lifestyle, particularly in relation to obesity (see below), this guideline must, as is intended, be used in conjunction with the other FBDGs to ensure that there is sufficient intake of foods containing protective factors and a reduced intake of foods which are known to increase the risk of disease.

## POTENTIAL PROBLEMS ARISING FROM THE GUIDELINE 'ENJOY A VARIETY OF FOODS'

The FBDG work group recognises that there may be a number of problems which arise in implementing this guideline, namely:

- The high levels of household food insecurity in South Africa.
- The recommendation of increasing dietary variety could be misinterpreted as increasing the number of processed foods, which in the urban context at least, could lead to an increase in the consumption of processed foods of poor micronutrient and phytochemical content.
- Increasing dietary diversity could lead to an increased dietary energy intake, thereby exacerbating the increasing prevalence of obesity in certain sections of the South African population.

### Household food insecurity and other barriers

On the basis of the available evidence there can be little doubt that it would be desirable to increase dietary variety of South African diets, particularly of people living in low income households. However, achieving this goal will be most difficult for this section of the population because of the constraints of poverty. There is ample evidence of household food insecurity in South Africa when either indirect or direct indicators are used to measure it. May,<sup>16</sup> using indirect economic indicators, has shown high levels of food insecurity, a finding confirmed by direct measurement of food present in low income households by the National Food Consumption Survey.<sup>2</sup>

The focus-group studies in KwaZulu-Natal and the Western Cape also identified affordability as a major constraint, particularly with regard to fruits, vegetables and foods of animal origin.<sup>6</sup> Other problems were time constraints and routine food-purchasing habits.<sup>6</sup>

Because the high levels of food insecurity in South Africa will make it difficult for people to apply this guideline, the implementation of the Poverty Alleviation Programme and promotion of income generation are important prerequisites to its success. In addition a nutrition education campaign is needed for all the guidelines, including this specific one. This campaign should be sensitive to financial and other constraints, be multisectoral and aim at targeting specific population groups at different levels of socio-economic status.

### Consumption of processed foods

Particularly in the urban context with an abundance of processed foods, increasing dietary variety could be misinterpreted as increasing the consumption of processed foods. This could be counterproductive in terms of the aim of this recommendation, particularly in relation to increasing micronutrient intake and changing the proportions of macronutrient intakes to reduce the risk of chronic degenerative diseases.

As stated by Gussow and Clancy,<sup>17</sup> 'The proliferating 'variety' in the supermarkets does not reflect an equivalent biological variety ... Thus nutritionists must help consumers learn to create a demand for a wider variety of whole foods instead of a succession of food novelties whose claim to diversity is based on processing techniques and artificial colors and flavors.' This is particularly true in view of the findings of Bourne,<sup>18</sup> which have shown that with migration to urban areas in South Africa, increased urban exposure was associated with an increased atherogenicity of the diet of African adults, namely an increase in the proportion of energy supplied by fat and a decrease in the proportion of energy supplied by carbohydrate. In terms of foods this was related to a decreased consumption of dairy foods and cereals and an increased consumption of meat, and also of non-basic foods or nutrient-empty foods, such as potato crisps and carbonated drinks. Of further particular interest to the issue of dietary variety is the finding of Bourne *et al.*<sup>19</sup> that the urban diet was confined to a relatively narrow range of foods, with low intakes of dairy products and fruits and vegetables. A later survey involving all population groups also showed that intakes of dairy products and fruits and vegetables are low, particularly in Asians, coloureds and Africans.<sup>20</sup>

The meaning of the guideline should therefore be discussed using appropriate food examples.

### Increase in obesity

The prevalence of obesity is high among some sections of the population in South Africa. Increasing dietary diversity could potentially lead to an increased energy intake and therefore contribute to a further increase in the prevalence of obesity and associated problems such as diabetes mellitus and cardiovascular disease.

Studies investigating the effect of increasing the variety of foods at a meal showed that more food is eaten when dietary variety is high than if the selection of food is limited.<sup>21</sup> Data on sensory-specific satiety by Rolls and McDermott,<sup>22</sup> suggest that increasing dietary variety in a manner which leads to different sensory properties of food does lead to increased energy intake. While this is desirable in certain situations, e.g. where the energy intake is lower than requirements, it is not desirable when it leads to the development of obesity. Rolls<sup>21</sup> warned that advice to eat a variety of foods might lead to overconsumption of energy. Food consumption data of a large and varied group of adults in the USA indicate that increased variety within food groups was also associated with increased body fatness and increased energy intakes. Further analysis of the data however also showed that this varied within food groups, e.g. increased variety within the vegetable group was negatively associated with percentage body fat whereas increased variety within the combined group of sweets, snacks and condiments was positively associated with the percentage of body fat.<sup>12</sup> McCorry *et al.*<sup>12</sup> concluded that a high variety of sweets, snacks,

condiments, entrees, and carbohydrates, coupled with a low variety of vegetables, promotes long-term increases in energy intake and body fatness. In terms of consumer understanding, therefore, in the USA the Dietary Guideline on variety was misinterpreted as a licence to consume foods that may not be considered healthy choices, a scenario to be avoided at all costs in South Africa.<sup>23</sup>

The US experience therefore raises three issues to be addressed in nutrition education of the South African consumer: firstly, the importance of limiting dietary variety within certain food groups where energy intake is adequate and emphasising the importance of fruit and vegetable consumption; secondly, the importance of including information about portion sizes; and thirdly, the importance of the guideline on physical activity.

### RATIONALE FOR THE USE OF THE TERM 'ENJOY'

Guidance given on the implementation and use of FBDGs by the FAO/WHO consultation<sup>24</sup> included the concept that guidelines should be user-friendly and positive without negative prescriptive clauses. Therefore, in formulating the first guideline the term 'enjoy' has been chosen. The working group is of the opinion that a recommendation to enjoy eating will encourage families to share meals, to use meal times to interact, relax and cope with stress — all measures to promote health and prevent the risk of disease. The term 'enjoy' is included in an attempt to ensure this. However, its effectiveness in this regard has not been tested in South Africa.

### CONCLUSION

The responses obtained from the focus groups of consumers as well as the thinking of nutrition scientists internationally are in line with the thinking of the Working Group in drawing up the guidelines.

While work on dietary variety is ongoing there is scientific evidence to support the inclusion of the use of the FBDG 'Enjoy a variety of foods', particularly with regard to increasing micronutrient and energy intakes and protection against the development of chronic diseases of lifestyle. However, careful thought should be given to the formulation of appropriate food guides and other measures so that increasing dietary variety does lead to increased intakes of foods from food groups which are currently infrequently consumed by many South Africans. This is important to ensure that micronutrient and energy intakes increase where appropriate, and at the same time to prevent increased energy intake and obesity in those individuals who already have an adequate energy intake. The challenge which faces South African nutritional professionals is to ensure that these goals are achieved within the context of high household food insecurity and increasing urbanisation.

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