CHAPTER 4

NUTRITION
AND CHRONIC DISEASES OF LIFESTYLE IN SOUTH AFRICA

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1. INTRODUCTION

South Africa has a complex mix of developed and developing areas in terms of its population and its economy. It has one of the highest Gini coefficients in the world (0.61), which illustrates the huge rift in income distribution between the majority of low-income households and the wealthy, minority group.[1] This element of unequal distribution is also evident in the dietary intake and the nutritional status of the South African population, which presents as a large prevalence of stunting in black children,[2] especially in rural areas, and a large prevalence of overweight and obesity in all ethnic groups, especially in urban areas.[3] For the majority of black population there are two scenarios. On the one hand, there is a large rural population, the majority of whom survive on an income of less than R1 000 per family/month, and usually still follow their traditional way of living. On the other hand, there is a growing urban population, which is faced with many new challenges and problems, including lack of housing, poor sanitation and sewage disposal, lack of adequate energy/fuel sources, lack of access to clean water and high rates of crime and violence.

In many ways, the newly-arrived urban dwellers have to change their lifestyle to adapt to the changes in their surroundings. Four of the most common lifestyle changes in this regard are a decrease in physical activity, a change in diet and eating patterns, adoption of tobacco use and increased alcohol use. It is difficult to describe these four factors in isolation since they are so intricately linked. In deep rural areas, physical activities are a routine part of everyday life. Few people in villages have cars, and transport is a dearly paid for luxury. Hence, villagers have to rely on walking. Children walk to school. Friends walk to each other's houses, and health facilities are often a long walk away.[4] Villagers have many routine physical activities, which include tasks like fetching water, making meals, fetching and chopping firewood and working in the fields. Since they seldom have electric appliances, they need to do all household tasks themselves. This means that they have less time for leisure time compared to their urban contemporaries. Even children depend on themselves to have fun and play games and are less likely to be occupied in sedentary pursuits.

However, over the last four decades television has slowly crept into the homes of more and more villagers, who now spend less time on activities and more time being inactive as a result of this. This has exposed them to the ruthless effects of advertising, which shows desirable foods, drinks and lifestyle, which are frequently beyond their reach. Many of these advertisements encourage unhealthy behaviour such as snacking on unhealthy food items and drinks.

In urban areas lifestyle changes have happened much faster.[5-9] Transport is readily available and there is no need or time for walking. In leisure time, watching television has replaced many physical and sporting activities. Furthermore, fast foods are available everywhere to replace the leisurely mealtimes when home-grown and indigenous foods were often the order of the day. Additionally, people may be exposed to unhealthy and polluted environments. There is a greater variety of food items available in urban areas. Many of these items will replace the typical rural foods of the past. These include foods which have traditionally been used as staples and are now replaced by township foods. Many of these are high in fat and sugar and have a low nutrient density.

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In order to understand the dynamics of dietary changes we examine the main food groups consumed by South African adults and children in urban and rural areas (Table 4.1). This Table presents a summary of data from combined databases using secondary data analyses (in lieu of no national data available on adults) to show the dietary intake of adults[10,11] and children (1-5 years)[2] in South Africa. Rural dwellers have a higher intake of cereals and vegetables. However, for most other food groups the urban adults and children far exceed the consumption of their rural fellows. This is particularly true for, sugar, meat, vegetable oil, dairy, fruit, roots, tubers and alcohol consumption.
To appreciate the magnitude of the transition and to tackle the changes in a meaningful way, it becomes important to identify the typical dietary pattern of the different populations in South Africa. This has more meaning if one evaluates these differences in terms of foods as well as in terms of nutrients. Four distinct types of diet can be identified and will be discussed below.

* Typical western South African diet;
* Typical rural African diet;
* Typical urban township diet;
* Indian urban diet.

The macronutrient compositions of these four dietary patterns are presented in Tables 4.2a and 4.2b and in Figs. 1-3 and will be discussed under the diet categories above. Furthermore, these diets are evaluated in terms of the WHO/FAO population goals.[12]

Table 4.1. Food groups consumed by South African adults and children in urban and rural areas[11]

	Adults and children 10+ years			Children 1-5 years		
Food groups	RSA g/day	Urban g/day	Rural g/day	RSA g/day	Urban g/day	Rural g/day
Cereals	870	736	1023	489	433	546
Sugar	76	120	27	65	93	39
Stimulants: tea, coffee	382	390	371	147	143	151
Vegetables	93	85	101	52	45	58
Meat and offal	86	102	67	45	56	34
Vegetable oils	8	11	5	5	6	3
Dairy	73	109	31	124	147	102
Fruit	61	83	36	48	70	27
Eggs	15	16	14	10	12	8
Legumes	35	34	36	17	15	18
Fish	12	14	10	7	8	5.8
Roots & tubers	40	59	19	29	32	27
Nuts & oilseeds	2	2	2	1	2	1
Alcohol	54	67	38	-	-	-
Soups	2.6	4.3	0.6	6	3	9
Condiments	0.5	0.7	0.3	0.2	0.2	0.1
Animal Fat	1.0	1.6	0.4	0.1	0.1	0.2

Table 4.2a. Comparison of macronutrient distribution in seven dietary studies in South Africa

Dietary factor	WHO[12] goals% of energy	CORIS[13] white rural	DIKGALE[14] black rural	BRISK[15] black urban	VIGHOR[16] white urban	Indians[17] urban	CRISIC[18,19] coloured urban (20-34 years)
Energy MJ		6.3 - 12.7	6.1 - 6.3	5.8 - 8.5	5.9 - 12.5	5 - 8.5	7.1 - 10.3
Total fat	15-30%	34.6 - 36.5	15.7 - 17.1	23.8 - 28.3	33.3 - 38.6	32.8 - 36.9	37.3 - 38
SFA	<10%	12.6 - 13.6	3.7 - 4.4	8.5 - 9.2	12.2 - 14.6	7.0 - 9.8	11.8 - 11.9
PUFAs	6-10%	5.9 - 7.0	3.7 - 3.9	4.5 - 7.2	5.6 - 7.8	9.5 - 12.5	9.1 - 9.2
CHO	55-75%	44.1 - 51.5	62.4 - 70.8	59.2 - 64.3	46.9 - 53.3	45.5 - 53.0	45 - 46.5
Free sugar	<10%	10.8 - 15.4	5.2 - 4.2	10.7 - 14.6	13.0 - 18.6	10.8 - 15.8	15 - 16
Protein	10-15%	13.8 - 16.6	14.2 - 15.6	13.1 - 15.3	13.6 - 16.3	11.9 - 13.8	14.9 - 15
Cholesterol	≤ 300 mg /day	243 - 509	144.9 - 116.6	-	140 - 176 mg /4.2 MJ	76 - 117 mg /4.2 MJ	290 - 440

Table 4.2b. The distribution of macronutrients in the diet of black South African males residing in different locations[20]

Dietary factor	WHO[12] goals	Rural n=194	Farm workers n=108	Informal settlement n=128	Middle class n=229	Upper class n=83
Energy (MJ)		9.6	8.9	9.3	9.9	8.3
Total fat (% of energy)	15-30	22.9	22.8	24.3	26.0	30.6
SFA (%)	<10	16.1	16.9	16.8	19.0	24.9
PUFAs (%)	6-10	14.8	12.2	14.6	16.5	17.2
CHO (%)	55-75	67.4	67.2	65.5	64.0	57.3
Protein (%)	10-15	11.6	12.1	12.0	11.8	13.2
Cholesterol (mg)	≤ 300	315	283	332	377	420
Fibre (g)		19.2	15.6	17.4	18.8	19.7

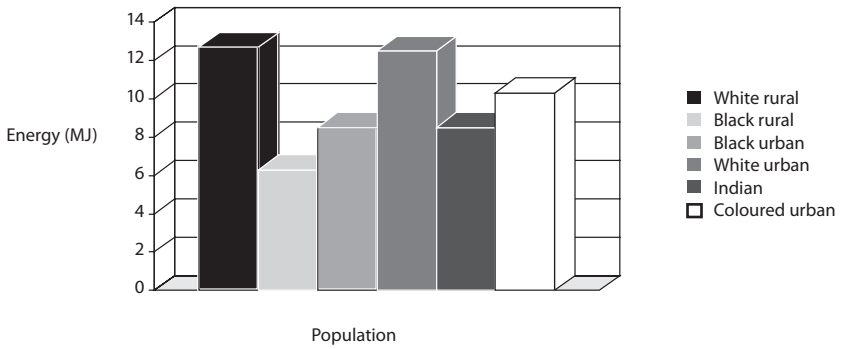

Figure 1: Mean daily energy intake of adult males as determined by secondary dietary analysis from studies between 1983 and 2002[12-20]

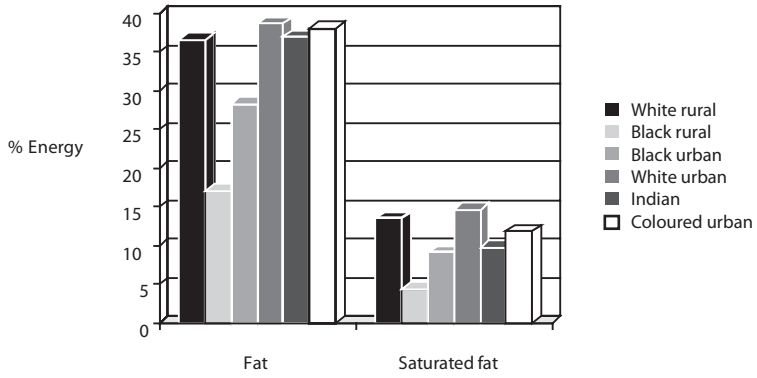

Figure 2: Mean daily fat intake as a % of total energy intake of males as determined by secondary dietary analysis from in studies from 1983 to 2002[12-20]

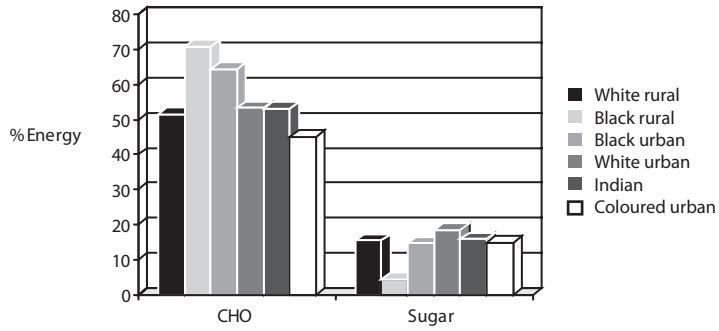

Figure 3: Mean daily carbohydrate and sugar intake (% energy) of males as determined by secondary dietary analysis from in studies from 1983 to 2002[12-20]

2. THE TYPICAL WESTERN SOUTH AFRICAN DIET

The typical western diet is the one followed by most of the white and coloured urban population and increasingly by black urban dwellers. The meal pattern is a three meal a day plan with one large meal being the main meal of the day.[21] Typically, the main meal contains a staple food, frequently rice and/or potatoes, a generous portion of meat or chicken, and generally at least 2 vegetables. Bread is usually eaten at one or more of the other meals. Since 1994, with the increased exposure to international communities, a greater variety, more fast food options, and more exotic items have also appeared on the menu.

In South Africa two large epidemiological studies have examined dietary intake in white South Africans.[13,22] The white South Africans in both studies had very similar energy intakes and the mean distribution of macronutrients was also similar, being higher than the WHO/FAO[12] population goals in most instances.

One of the earliest of these studies, the Coronary Risk Factor Study (CORIS), was undertaken in the seventies in three towns (rural) of the Western Cape. The total populations of the three towns who participated in 1979 comprised 7 188 subjects. Dietary intake data were collected by means of a 24-hour recall. The results indicate that fat intake was very high and did not conform to a prudent diet.[13]

Table 4.3 presents data on the food groups, actual foods, and portion sizes eaten by the white rural population in the CORIS study.[13] The adults were found to have a very high meat, dairy and egg intake, which accounts for the high percentage fat and saturated fat intake. The high sugar intake is due to table sugar, soft drinks, sweets, and instant puddings. Dairy was mainly in the form of whole milk and full-fat cheese. Fruit and vegetable intake per capita was high (392 g) and showed a substantial variety of different items. The fruit and vegetable intake was close to the 400 g recommended by the WHO/FAO.[12]

The second study on white adults was undertaken in the eighties on a random sample of white adults (n=317) living in the urban centres of Witbank and Vanderbijlpark. Dietary assessment was done by means of a 24-hour recall in order to typify a typical western diet in urban areas.[16] The study is known as the Vanderbijlpark Information Project on Health Obesity and Risk Factor (VIGHOR) study (Tables 4.2a & 4.2b). As can be seen, the macronutrient distributions are virtually

the same as those in the CORIS study, with the exception of a higher cholesterol intake in the latter. Unfortunately, there is little description of the actual foods consumed.

In 1982, a random sample of coloured urban subjects (n=976) were evaluated in the Coronary Risk Factor Study (CRISIC) which was undertaken in the Cape Peninsula (Tables 4.2a & 4.2b).[18,19] They had very similar intakes to those of the urban whites in VIGHOR. However, energy intake, carbohydrates, fat, and saturated fat were lower in coloured males compared with white males, while cholesterol and polyunsaturated fats were lower. Most nutrients did not conform to the prudent guidelines.

Unfortunately, little data on coloured rural adults are available, yet a study on adolescents shows interesting trends.[22] The study was undertaken on 11-12-year-old coloured, white and black children (n=872) in the Western Cape in 1986. It was found that in urban areas sugar, whole milk, brown bread, white bread, oats, maize meal, and condensed milk were the items most frequently consumed by coloured adolescents. In the rural areas, it was found to be sugar, brown bread, white bread, whole milk, sifted maize meal and non-dairy creamer. The energy and fat intake of the diet of the urban coloured children was higher than that of rural ones and lower in carbohydrates.[23] Another important finding was the degree of dietary diversification in the different population groups.[22] White urban children consumed a large variety as indicated by 74 different food items, while urban coloured and black adolescents had a variety of 50 and 45 respectively. In rural areas the variety decreased in all groups to 48 in whites, 42 in coloureds and 32 in blacks.

Table 4.3. Main food items consumed by a white rural group in the Western Cape Province (CORIS)[13] as determined by secondary data analysis[11]

Total food group	Food items included	% of group consuming the item	Per capita per day (g)
Alcoholic beverages	Cane spirits, brandy, gin, whisky wine, beer	27.4	97.7
Cereals	Bread, cookies, pancakes, pudding, cakes, rusks, wheat-based cereals, crackers, maize porridge, pasta, oats, samoosas, fat cakes, savoury charts, maize-based cereals	98.0	285.5
Fish	Sea fish, cooked fresh	21.5	27.4
Fruit	Apples, grapes, bananas, orange juice, peaches, avocados, fruit juices, canned peaches, pineapple, pears	68.7	251.6
Meat & offal	Mutton, chicken, meat products, beef sausage, beef, meat gravy, pork products, minced beef, dry meats	92.6	218.8
Milk and milk products	Full-cream milk, skim milk, butter, ice cream, high-fat cheeses, cheese spread, condensed milk	92.8	306.3
Eggs & products	Egg dishes	30.3	25.3
Nuts & oil seeds	Peanut butter	3.0	2.4
Pulses	Split peas, sugar beans, haricot beans	16.5	47.5
Roots and tubers	Potatoes, sweet potatoes, carrots, beetroot, potato crisps	72.1	148.5
Soups		3.5	7.1
Stimulants	Tea, coffee, chocolate sweets	96.5	848.0
Sugar & products	Sugar, jam, carbonated cold drink, squash, sweets, jelly, honey, instant pudding	88.5	209.6
Vegetables	Tomato, green beans, pumpkin/butternut, lettuce, onion, peas, gems, wild leaves (beetroot, pumpkin etc), cabbage, cauliflower, cucumber	77.3	139.7
Vegetable fats & oils	Brick margarine, medium/low-fat margarine in tubs, non-dairy creamer	87.1	25.3

3. DIET OF BLACK SOUTH AFRICANS RESIDING IN RURAL AREAS

Dikgale rural adults had the most prudent diet as far as compliance with the international guidelines goes (Tables 4.2a & 4.2b).[14] They had a very low fat intake and a high carbohydrate intake, which is typical of the traditional type of diet found in African countries in rural areas.[24] MacIntyre *et al*.[20] had similar findings for rural participants in their Transition Health and Urbanisation Study in South Africa (THUSA).

Table 4.4 presents dietary data of a black adult rural group (n=210) obtained by means of four 24-hour recalls.[14] The black participants had been randomly selected from the adult population in Dikgale in Limpopo Province. Some interesting differences are noted when comparing with the white adults in Table 4.3. The Dikgale adults had the highest per capita intake of cereals when compared with the white group (1034 g vs. 285.5 g). Furthermore, the black group had very little variety within the cereal group with only maize, sorghum and bread being consumed (54% brown, 11% white bread). Two items that had a higher intake in the black group were nuts and legumes. Legumes (65 g) made a significant contribution to the diet of the Dikgale group. Regarding all the other food groups, the white participants had much higher intakes. This was particularly noticeable for intake of meat (218.8 g vs. 64.2 g), dairy (306.3 g vs. 12.4 g), fruits and vegetables (392 g vs. 134.2 g) and vegetable fats (25.3 g vs. 2.3 g).

From a nutritional point of view, the different types of nutrient intakes of these two groups can be explained by their differing intakes of food groups. The whites had higher fat and saturated fat intakes based on their high consumption of meat, full-cream dairy products and vegetable fats. Conversely, the black group had a very high cereal consumption resulting in a high contribution of carbohydrate to energy intake. The black group had a very low intake of fruit and vegetables, i.e. 134.2 g compared with the 400 g recommended by the WHO/FAO.[12] Therefore, one would expect them correspondingly to have lower intakes of folate and vitamins A and C. When comparing the black group with the overall rural intake for South Africa (Table 4.1), there is a very close match on all food groups.

Table 4.4. Main food items consumed by a black rural group in Dikgale in the Limpopo Province using four 24-hour recalls

		Limpopo Province[11,14]	
Total food group	**Food items included**	**% Consuming the item**	**Per capita per day (g)**
Alcoholic beverages	Commercial and home-made beer	4.2	71.3
Cereals	Maize porridge, sorghum, brown bread, white bread	98.6	1034.5
Fish	Canned fish	3.2	3.3
Fruit	Apples, orange juice, avocados,	12.5	27.2
Meat & offal	Chicken, beef, giblets	46.3	64.2
Milk and milk products	Full cream milk, non-dairy creamers	10.2	12.4
Eggs & products	Egg dishes	7.4	8.8
Nuts & oil seeds	Peanut butter	6.6	2.4
Pulses	Kidney beans, sugar beans, haricot beans	22.2	65.0
Roots and tubers	Potatoes, sweet potatoes	10.6	25.4
Stimulants	Tea	69.4	485.4
Sugar & products	Sugar & cold drinks	65.7	23.7
Vegetables	Tomato, green beans, pumpkin/ butternut, lettuce, onion, peas, gems, wild leaves (beetroot, pumpkin etc), cabbage, cauliflower, cucumber	48.1	107.0
Vegetable fats & oils	Brick margarine, medium/low-fat margarine in tubs, non-dairy creamer, condensed milk, non-dairy cream, salad dressing, mayonnaise	25.5	2.3

4. BLACK URBAN (TOWNSHIP) DIET

Black urban participants had similar protein and sugar intakes to adults in the VIGHOR study and CORIS study. However, their fat intakes were lower and their carbohydrate intakes were higher as indicated by Figs. 2 and 3.

The Black Risk Factor Study (BRISK) remains the only recent study where the diet of a black urban population (n=983) has been studied in South Africa.[15] There are large differences in food intake between the urban and rural areas. Rural participants in Dikgale (Table 4.4) had a larger per capita intake of cereals of 1034.5 g per day, compared with 492.7 g in the BRISK study (Table 4.5). Vegetable intake was greater in Dikgale (107 g vs. 47.5 g) as were legumes (65 g vs. 27.8 g). Per capita meat intake was nearly double in BRISK (112.2 g) compared with Dikgale (64.2 g). Vegetable fat/oil were six times greater in BRISK (13.3 g) than in Dikgale (2.3 g). These findings are supported by results from a study undertaken on black first year female students at the University of the North, which showed some interesting differences between those girls from urban areas compared with those from rural areas.[25] Urban women consumed significantly more sugar (65.8 g vs. 52.2 g) and confectionary (290 g vs. 182.7 g than rural women did. They also had higher intakes of meat (124.0 g vs. 108.1 g), wheat products (275.5 g vs. 246.9 g), oil/fats (40.1 g vs. 33.8 g), fruit (687.1 g vs. 539.4 g) and beverages (339.6 g vs. 225.2 g). Students from rural areas had higher intakes of legumes (18.9 g vs. 6.3 g), and cereals, particularly maize meal (297.7 g vs. 206.7 g).

Table 4.5. Main food items consumed by a black urban group in Cape Town (BRISK)[15] as determined by secondary data analysis[11]

Total food group	Food items included	% of group consuming the item	Per capita per day (g)
Alcoholic beverages	Commercial and home-made beer	7.0	97.0
Cereals	Maize porridge, rice, brown bread, white bread, samp, fat cakes, savoury tart	98.5	492.7
Fish	Canned fish	10.6	12.5
Fruit	Apples, peaches, bananas, pears, orange juice, grapes, fruit juices	28.9	91.8
Meat & offal	Chicken, beef gravy, meat dishes, mutton, beef, beef offal, beef sausage, mince	74.0	112.2
Milk and milk products	Full cream milk, full cream processed milk (buttermilk & maas)	59.9	152.4
Eggs & products	Egg dishes	16.2	15.4
Animal fats	White, chicken fat, beef tallow	31.2	3.5
Nuts & oil seeds	Peanut butter	4.4	1.4
Legumes	Kidney beans, sugar beans, haricot beans	17.2	27.8
Roots and tubers	Potatoes, sweet potatoes	49.2	85.6
Stimulants	Tea & coffee	72.6	272.8
Sugar & products	Sugar, cold drinks, squash	89.1	215.7
Vegetables	Cabbage, tomato & onion, pumpkin/butternut, onion, peas, gems	42.8	47.5
Vegetable fats & oils	Brick margarine, medium/low-fat margarine in tubs, non-dairy creamer, condensed milk, non-dairy cream, salad dressing, mayonnaise	61.5	13.3

5. THE DIET OF THE INDIAN URBAN POPULATION IN SOUTH AFRICA

Dietary surveys in the Indian population are scarce and the one by Wolmarans *et al*.,[17] represents the largest study yet (Tables 4.2a & 4.2b). Little information is available on the actual foods consumed in this study, only the nutrients intakes are presented. The macronutrients show that total fat intake, polyunsaturated fat and sugar intakes exceed the recommended amounts.

In 1984 Mackeown *et al*.[26] reported on the diet of 4-5-year-old Indian children (n=598) in Transvaal. Food items which contributed most to the energy intake of their diet were (in descending order): malted milk (such as Milo), white bread, milk, brown bread, and sugar; while malted milk, mutton, milk, white bread and chicken contributed most to protein intake. Fat sources were margarine, malted milk, milk, crisps and cheese. In terms of percentage food items consumed, from highest to least, were milk, cold drink, tea, malted milk and squash.[27] The quality of the diet hence reflects certain unhealthy eating habits of Indian children, particularly the high consumption of sweetened beverages.

6. SOUTH AFRICAN FOODS ACCORDING TO FAO FOOD BALANCE SHEETS

In Table 4.6, food balance sheets for South Africa over a period of 40 years (1962 to 2001) are presented. It is important to remember that food balance sheets present total amounts of foods consumed, and present the results in a manner that reflects equal distribution: it presents the total of what is available and not how it was distributed. Furthermore, it is regarded as a very crude estimate of dietary intake and has only been included because national data on dietary intake surveys were not available prior to 1999. Certain trends have been noticed over the 40-year period. Per capita energy intake increased from 2605 calories per day in 1962 to 2921 calories in 2001, fat increased from 61.2 to 79 g, while protein intake increased from 68.4 to 79.0 g.

Cereal consumption increased from 169 kg per capita per annum in 1962 to 187.8 kg in 2001. A similar increase was noted for starchy roots (13-29.7 kg), vegetable oils (5.7-14.5 kg), fruits (24.1-36.0 kg), all alcoholic beverages (43.8-56.8 L), meat (31.6-37.5 kg), eggs (2.5-6.1 kg), and fish (5.5-7.9 kg). For some foods per capita intakes decreased: sugar and sweeteners (39.4-32.8 kg), offal (4.5-3.8 kg), animal fats (including butter) (3.0-0.7 kg) and milk (78.0-54.1 kg).

These data represent the following scenarios. Intake of cereals gradually increased, as did vegetable oils and the other items mentioned above. This accounts for the overall increase in energy intake (Fig. 4). The bad news is that vegetable oil (Fig. 5) and meat increased significantly, which accounts for the large increase in fat intake. Meat intake increased from 31.6-37.5 kg (per annum) between 1962 and 2001. This is indicative of an increase in saturated fat intake. Also of concern is the increase in alcohol consumption and the fact that vegetable intake remained constant (43.5-44.2 kg per annum). Overall, fruit and vegetable intake was 185 g/day in 1962 and 219.7 g/day in 2001. Although there is an increase in fruit and vegetables, the average is still far below the recommended amount of 400 g per day.[12]

In terms of the recommendations of the WHO/FAO,[12] the following trends in South Africa are not desirable:

1. Poor intake of fruit and vegetables
2. High and increasing fat (polyunsaturated and saturated) intake
3. Decrease in milk intake
4. Overall increase in energy intake
5. High and increasing alcohol intake
6. Low fibre intake – since intakes of fruit, vegetables and legumes are low.

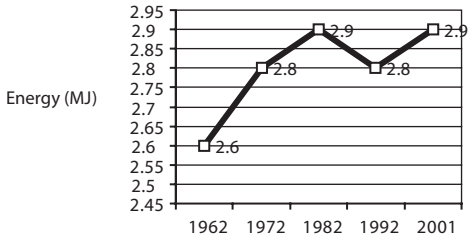

Figure 4: The per capita daily intake of calories (/1000) in South Africa between 1962 and 2001[28]

Table 4.6. Food balance sheets for South Africa between 1962 and 2001[28]

Products	Year 1962				Year 1972				Year 1982				Year 1992				Year 2001			
	Kg*	Cal	Pro	Fat	Kg*	Cal	Pro	Fat	Kg*	Cal	Pro	Fat	Kg*	Cal	Pro	Fat	Kg	Cal	Pro	Fat
Grand Total		2603	68.4	61.2		2819	74.6	66.4		2905	77.1	66.0		2790	75.3	68.8		2921	75.1	79.0
Cereal-Excluding Beer	169.3	1434	38.7	10.9	173.4	1467	39.9	10.7	186.1	1576	43.1	11.1	173.4	1480	40.0	10.5	187.8	1601	42.6	11.5
Starchy roots	13.2	27	0.5	0.0	22.6	45	0.9	0.1	25.3	50	1.0	0.1	24.9	50	1.0	0.1	29.7	58	1.2	0.1
Sugar & Sweeteners	39.4	383	0.0		40.5	394	0.0		39.6	386	0.0		35.5	346	0.0		32.8	319	0.0	
Pulses	2.5	23	1.5	0.1	3.4	32	2.1	0.1	3.2	29	1.9	0.1	4.0	37	2.4	0.2	2.8	25	1.7	0.1
Treenuts	0.1	0	0.0	0.0	0.1	1	0.0	0.1	0.1	1	0.0	0.1	0.2	1	0.0	0.1	0.3	2	0.1	0.2
Oilcrops	1.1	12	0.5	1.0	1.5	16	0.6	1.4	1.1	11	0.5	0.8	1.5	14	0.8	1.1	2.2	23	1.4	1.8
Vegetable oils	5.7	137	0.0	15.6	7.3	176	0.0	19.9	7.5	183	0.0	20.6	9.4	229	0.0	25.9	14.5	352	0.0	39.8
Vegetables	43.5	35	1.6	0.3	46.8	36	1.6	0.3	52.8	39	1.7	0.3	46.1	35	1.5	0.4	44.2	36	1.5	0.3
Fruits	24.1	26	0.3	0.2	38.0	41	0.5	0.3	30.3	37	0.4	0.2	35.4	42	0.5	0.2	36.0	41	0.5	0.3
Stimulants	1.7	5	0.4	0.3	1.8	6	0.4	0.4	1.3	5	0.3	0.4	1.1	2	0.2	0.1	1.1	3	0.2	0.2
Spices	0.4	4	0.1	0.1	0.4	4	0.2	0.1	0.4	4	0.2	0.1	0.3	3	0.1	0.1	0.2	2	0.1	0.1
Alcoholic Beverages	43.8	84	0.3		79.4	146	0.6		79.1	144	0.6		64.4	132	0.6		56.8	104	0.5	
Meat	31.6	202	11.9	16.8	35.4	221	13.3	18.3	36.8	222	14.0	18.0	43.0	246	16.6	19.4	37.5	204	14.4	15.8
Offal, edible	4.5	14	2.1	0.5	4.1	13	2.0	0.4	4.0	13	2.0	0.4	3.9	12	1.9	0.4	3.8	12	1.9	0.4
Animal fats	3.0	58	0.1	6.6	2.0	40	0.0	4.5	1.9	40	0.0	4.5	1.2	26	0.0	2.9	0.7	14	0.0	1.5
Milk	78.0	134	7.0	7.9	94.8	149	8.3	8.2	85.8	134	7.5	7.5	60.3	97	5.3	5.5	54.1	85	4.7	4.8
Eggs	2.5	9	0.8	0.7	3.6	14	1.1	1.0	4.6	18	1.4	1.2	4.7	18	1.5	1.3	6.1	23	2.0	1.6
Fish	5.5	14	2.5	0.4	7.9	19	3.0	0.7	8.7	15	2.3	0.5	9.2	19	2.9	0.8	7.9	16	2.4	0.6

*This amount can be divided by 365 to give per capita g per day

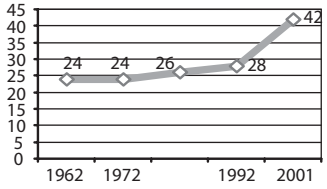

Figure 5: The per capita (g/day) intake of vegetable oil in South Africa between 1962 and 2001[28]

Ischaemic heart disease

Since the seventies researchers have been examining diet and ischaemic heart disease (IHD) in South Africa. Some of these studies are discussed here to illustrate the nutritional problems facing different population groups, particularly in those groups undergoing transition and acculturation.

Indians in South Africa have a high mortality of cardiovascular diseases.[29] Among the 778 subjects (15-69 years old) that were evaluated in Durban, 15% had a history of IHD. Dietary intake, particularly fat and saturated fat intake, plays a role in this high prevalence of IHD. Wolmarans *et al*.[17] examined the diet of randomly selected Indian adults (n=776) living in Durban (Tables 4.2a & 4.2b). Their findings showed that the total mean fat intake was more than 30% of energy intake (EI) and the saturated fat intake was higher than 7% in nearly all age and gender categories. The polyunsaturated fat intake was more than 10% EI; hence high P:S ratios were found. Fibre intakes in all categories were less than recommended for a prudent diet[12] and sugar intake was higher than the recommended 10% EI and ranged from 10.8-15.8%.

A similar intake was reported in an earlier study with 12-year-old Indian children living in Cape Town. In this study, it was found that the macronutrient intake as a percentage of EI was 36% for fat, protein 13% and carbohydrate 51%.[30] Sugar consumption was high and varied between 14-16% for girls and 13-17.6% for boys. Fibre intake was very low and ranged between 8-9 g/day.

Mia and Vorster[31] reported on IHD risk factors in Indian adolescents (n=321) aged 16-18 years who were residing in Lenasia in 1988 when the study was undertaken. They found that the teenagers habitually consumed a diet very high in fat (41.5-47.7% EI). Additionally, they reported on significant relations between increased serum low-density lipoprotein cholesterol (LDLC) and increased dietary cholesterol, vitamin B12, zinc and total fat, illustrating the important role of diet.

In 1982, the CRISIC study was undertaken with the objective of investigating risk factors for IHD in the coloured population. Overall, the diet was found to be low in fruit and vegetables, and dairy products.[18,19] In terms of nutrients, it was found that in a sample of 976 subjects (15-64 years) the diet was found to be very high in fat (37% EI) and animal protein, with a P:S ratio of 0.85. Only 32.2% of men and 27.5% of women consumed a prudent diet.[22] Furthermore, four variables which contributed 26.9% in linear regression in men were polyunsaturated fat, P:S ratio, saturated fat intake, and cholesterol intake. In women it was age, P:S ratio, and cholesterol. Saturated fat intake was found to be 29.9 g/day for men and 17.1 g/day in women. Fibre intake was low at 12.4-13 g/day.

A study of 11-12-year-old coloured children in the Western Cape found that there were differences in fat intake between urban and rural children. Fat as percentage of EI was 33% for urban boys vs. 29% for rural ones. In girls, this was 36% vs. 29%. Added sugar was 12% in girls and boys.[21]

IHD is one of the leading causes of mortality in white adults. In 396 white subjects examined in Durban in 1987, it was found that a history of IHD was present in 9.3% of adults.[32] However, prior to 1979 a paucity of data on the white population and dietary factors contributing to IHD existed. Hence, the CORIS study was undertaken in 1979 to examine the prevalence of risk factors in the white population in rural areas, as discussed earlier.

In 1988 a random sample of white adults (n=317) living in the urban centres of Witbank and Vanderbijlpark (VIGHOR) was evaluated by a 24-hour recall to typify a typical Western diet in South Africa.[16] It was found that fat and fibre intakes were not in line with those for a prudent diet. Total fat intake ranged between 33.3-38.6%, saturated fat 12.2-14.6%, added sugar 13.0-18.6%, and fibre 10.9-24.3 g (Tables 4.2a & 4.2b). Their mean dietary intakes were found to be very similar to the intakes of the CORIS participants. Furthermore, dyslipidaemia was common with males and females having serum total cholesterol (TC), LDLC and serum triglyceride (TG) mean values above the recommended cut-off levels. Additionally, the mean high-density lipoprotein cholesterol/total cholesterol (HDLC/TC) ratio values of the participants fell below the recommended value of 20%.

In the CORIS study, the meat group was the main source of fat and saturated fat in the diet, contributing 37-39% of total fat for females and males, followed by the fat group, which contributed 22-24% of EI. Only 23% of males and 19% of women had a fat intake less than 30% of EI and only 15% of males and 34% of women had a fibre intake ≥10 g/4.2 MJ.[13] A part of the CORIS project intake was also an evaluation of the diet of 3-4-year-old white children (n=194). Fat intake contributed 35% of EI and the P:S ratio was 0.52; a reflection of the diets of the adults.[33] A more disturbing aspect of their diet is the quality of the foods consumed. Bremner *et al*.,[34] evaluated the snacking habits of these white preschool children. Soft drinks were consumed most frequently, followed by fresh fruits and fruit juices, sweets, chocolates and sugar. Between-meal snacks contributed more than one-third of EI.

The black population in the rural areas of KZN has a diet that differs in its contribution to risk for IHD. Ndaba and O'Keefe[35] described the staple diet as comprising maize meal that is eaten 2-3 times a day. Bread is consumed about once a day and meat 2-3 times a month. Fresh vegetables are usually cooked with the maize, particularly the wild green leafy ones. Similar findings were found in studies undertaken in Limpopo province.[14] The diet is a very prudent one, which is low in total fat and saturated fat, low in non-basic foods and high in fibre.

According to Seftel *et al*.,[36] black people in rural areas have a favourable risk profile for IHD, except for their high Lp (a) levels. Their LDLC values were found to be low, providing a favourable HDLC/LDLC ratio. This profile may be enhanced by high levels of physical activity, combined with a prudent diet.

However, the BRISK study showed that there are changes in the diet of black Africans in accordance with how long they have resided in urban areas. Over time, they tend to adopt the unhealthy eating pattern of the white and Indian populations, as shown in Tables 4.2a, 4.2b and 5.[15] Comparison with rural adults show that they have a higher intake of energy, fat, saturated fat, polyunsaturated fat and sugar than their rural counterparts. Although these intakes are lower than those of white adults, they have already shifted towards being less prudent. More recently, the THUSA study.[20] showed similar results when comparing rural adults with upper-class urban residents (Tables 4.2a & 4.2b). Fat intake increased from 22.9% to 30.6%, carbohydrate decreased from 67.4% to 57.3%, and protein increased from 11.6% to 13.2% in rural to urban areas, respectively.

Type 2 diabetes

There are little data reported on the dietary intake of diabetics in South Africa. Indeed, it appears that less than 7% of patients are treated by di*et al*one.[37] Two cross-sectional studies have evaluated diet in type 2 diabetic patients in South Africa: one in the rural areas of Limpopo province[37] and one in the urban area of Ga-Rankuwa.[38] There were noticeable differences in dietary energy composition between the two studies. In the urban area, fat intake exceeded 30% EI and carbohydrate was less than 55%. In the rural area, the EI distribution fell within that recommended for a prudent diet. Although the food items eaten in the two areas were similar, there was a higher consumption of soft drinks in the urban group.

An intervention study was undertaken among overweight and obese diabetic patients in Ga-Rankua.[39] One group was given a Western type of diet, while the experimental group received a traditional African diet that was high in plant protein and complex carbohydrates and low in fat. After 5 months there was no significant improvement in glycaemic control in the experimental group. Nutritional research related to the prevention and management of diabetics in South Africa is scarce, even though diabetes contributes significantly to the burden of diseases in the country.[40]

Another trend in diet over the past decade has been the adoption of the glycaemic index (GI) as a tool to use in educating type 2 diabetics and weight watchers. A few local studies have also followed this trend by determining the GI of local foods.[41,42] However, the subject is still controversial and the American Diabetes Association (ADA) has indicated that they do not recommend the use of the GI at this time since there is insufficient supporting evidence. Similarly, the latest Mahan and Escott-Stump edition of Krause's Food Nutrition and Diet Therapy[43] concur with the ADA position.[44] In view of this, it is recommended that we take a "wait and see" outlook in South Africa until sufficient long-term data are available.

Obesity and overweight

The prevalence of overweight and obesity is very high in South Africans.[3] Fifty-six percent of women and 29% of men have a body mass index ≥25 kg/m^2. The problem is not only confined to adults. Findings of the NFCS revealed that the prevalence of stunting was 19.3% while

overweight and obesity affected 17.1% at the national level. Furthermore, stunting conferred an increased risk of overweight (OR=1.8).

Both management and prevention of obesity remain complex issues for health professionals to deal with. South Africa is facing the same burden of diseases associated with obesity, as do other developing countries, and the prevalence continues to rise worldwide.[45-48] One of the challenges facing health professionals is the treatment available to overweight and obese clients at health centres. This is also the case in South Africa where the total number of registered dieticians is less than 1 600. Consequently, nurses or doctors, who are not well trained in this regard usually do counselling. Another difficulty is the fact that there are few successful intervention models for health professionals to adopt. Such an intervention would need to include a physical activity component as well as a dietary component. It would also need to be available over a long period since it needs to be regarded as a lifestyle change and not as a quick weight loss fix. Currently, a myriad of solutions are available in South Africa, many of which defy the realms of science. Yet a public who is desperate for quick fixes will try one after the other to attain the elusive "slimness" promised.

In the past decade there has been an increase in the amount of literature relative to both food insecurity and to obesity.[49-52] Adams *et al*.[52] found that in Californian women obesity was more prevalent in the food-insecure (31%) than in food-secure women (16%). Food insecurity without hunger was associated with an increased risk of obesity in whites (OR=1.36). Food insecurity with hunger was associated with increased risk of obesity for Asians, blacks and Hispanics (OR=2.8). Similarly, Griffiths and Bentley[51] found that in urban India where 4% of the sample lives, 37% of the food-insecure women were overweight or obese, whereas in the rural areas more were underweight.

Health professionals and patients' knowledge about nutrition and chronic diseases

Recently, a nutrition-based knowledge test was developed and validated to evaluate the knowledge of health professionals in Cape Town.[53] The main findings were that health professionals remarkably identified the mass media as their main sources of information on lifestyle modification. They also identified lack of client compliance, lack of time and lack of knowledge as barriers, which prevent them from counselling on lifestyle modification. There were also physical barriers, such as lack of equipment and space at the health facilities.

A study in Limpopo Province showed that 56-72% diabetic patients (n=288) had a special diet explained to them by a doctor, 12-27% by a nurse, and only 4-16% had seen a dietician.[37] Less than half the patients had received food exchange lists, and they had many complaints about the dietary advice they had received, including cost, not being tasty, not traditional and that certain recommended foods were not available. Patients were asked about foods allowed in the diet,which they had been given. Numerous errors indicated that the health professionals were not au fait with the required dietary knowledge in this regard.

A study has also been undertaken to identify the nutrition knowledge of hypertensive patients attending Day Hospitals in the Cape Metropole.[54] Overall, patients' knowledge regarding their diet was poor. More than 34% of them believed that they could use flavour enhancers with mono-sodium glutamate instead of salt. Furthermore, 23.5% believed that smoked and tinned meat and fish have a low sodium intake. Only 15% of the group knew what their daily salt allowance should be.

7. DIETARY PREVENTION AND MANAGEMENT OF CHRONIC DISEASES IN SOUTH AFRICA

In 2003, the Centre for Health Systems Research and Development undertook a survey with regard to the treatment received by patients with chronic diseases.[55] Patients (n=1 500) were randomly selected from three provinces in South Africa. Hypertension was the disease most frequently seen in patients (41%) followed by diabetes (14%). Most of the advice given to patients was found to be related to body weight (34.4%) and nutrition (54.6%). Nearly 60% of patients were advised on changing their diet, while 45% were advised to increase their physical activity. Regarding the nutritional advice given, most of it was found to relate to decreasing fat, sugar and salt intake. Hence, dietary advice is perceived as a crucial factor in the treatment of patients with chronic diseases.

Although the Department of Health (DOH) focuses mainly on undernutrition in South Africa, they have set a strategic objective for nutrition-related chronic diseases. This is, "To contribute

to reduction of nutrition-related diseases of lifestyle (obesity, IHD, hypertension and type 2 diabetes)".[10] They substantiate this objective by quoting the prevalence of overweight and obesity in South Africa. The current prevalence of overweight is 19.8% in males and 26.1% in females, while obesity occurs in 9.3% of males and 30.1% of females.[3] The DOH has presented specific targets for the decrease of overweight and obesity in females by the year 2007. The targets for overweight are a reduction to 15% in males and 20% in females, and for obesity 7% and 25% respectively. However, the specific strategies to do this have not been spelled out. Despite this, certain initiatives have been implemented. Probably the most important of these is the development of the food-based dietary guidelines, which are aimed at the general public.[56] These guidelines can be viewed as an important preventative strategy for chronic diseases of lifestyle in the population.

The development of the guidelines is a joint initiative between the Nutrition Society, Association for Dietetics in South Africa, Medical Research Council, industry and the DOH. Some of the guidelines are particularly relevant to the prevention of chronic diseases, such as IHD and type 2 diabetes, and are as follows:

- *Eat plenty of fruit and vegetables ever day* – for their fibre, micronutrient, antioxidant and other essential properties;
- *Eat dry beans, peas, lentils and soya regularly* – for increased fibre, protein, and flavanoid intake;
- *Eat fats sparingly* – to prevent a high intake of fat and saturated fats;
- *Use salt sparingly* – because of the detrimental effect of a high sodium intake;
- *Use foods and drinks that contain sugar sparingly, and not between meals* –these foods have a low nutrient density, and because of the association of sugar with obesity and for the prevention of dental caries;
- *If you drink alcohol, drink sensibly* – excessive alcohol consumption is a risk factor for IHD, hypertension, diabetes;
- *Be active* – important preventative/management measure for diabetes, obesity, and improved hypertension.

One of the guidelines, however, is focused more on the prevention of protein, calcium, and iron deficiencies, and may cause some confusion: Chicken, fish, meat, milk or eggs can be eaten every day. Ideally, one would prefer to encourage the eating of fish to at least once or more times a week, the daily use of low-fat dairy products, and the use of lean meat on a less regular basis. This is particularly relevant to the intake of red meat, which is the main source of saturated fat, and has been increasing (Table 4.6).

The initiative regarding the food-based dietary guidelines has been taken further by the development of educational materials on each guideline. These guidelines are aimed at the public and have been developed in a way that most adults with some high school education will understand.

8. RECOMMENDATIONS

Nutrition and related chronic diseases in South Africa is still a neglected topic and needs to be addressed at many levels. From the perspective of the health professionals, there is a need for better knowledge to empower them to counsel patients requiring special diets. Additionally, barriers to such counselling need to be addressed. From the patient's perspective, they need to be provided with correct information and services, which deal with them in the long term.

To prevent the burden of chronic diseases in South Africa from increasing in the next few decades, active and progressive action is needed by policymakers. They should be reminded of the very important role diet plays as a determinant in most chronic diseases. It will not be possible to prevent or to manage these diseases without managing the dietary aspects. This implies that the population has to be educated regarding a healthy diet, in conjunction with being physically active and abstaining from excessive alcohol intake and tobacco use.

One way of achieving such a policy would be to initiate a task team to evaluate the current knowledge of chronic diseases in the training of health professionals, as well as strategies to provide suitable health education materials at primary care level and to schoolchildren.

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