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Nutrition knowledge among a sample of urban black and white South Africans

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The aim of the study was to investigate gaps in nutrition knowledge and the relationship between nutrition knowledge and sociodemographic characteristics in an urban black and white South African population. The sample included 90 blacks and 90 whites living in former white and black urban areas in the Limpopo Province of South Africa, chosen by systematic random sampling via a telephone survey. Measures used included a general nutrition knowledge questionnaire. Results indicate that both blacks and whites seem to have a reasonable knowledge of dietary recommendations and sources of nutrients but have less knowledge on the diet-disease relationship, particularly with regard to choosing everyday foods that are healthier. Whites have significantly more general nutrition knowledge than blacks. Although there was no significant difference when comparing black and white men on general nutrition knowledge, black women had significantly lower nutrition knowledge than white women.

According to Steyn,[1] 41% of the reported mortality in South Africa was due to non-communicable diseases in 1996 (the most recent analysis of mortality patterns). Use of the Actuarial Society of South Africa's demographic and health model suggested that in 1996, 487 people died per day due to non-communicable diseases. This figure rose to 536 deaths per day in 2001 and should reach 563 deaths per day in 2010.

South Africa is a country undergoing epidemiological transition, with communities adopting unhealthy lifestyles. This includes smoking tobacco products, being physically inactive and consuming a typical westernised diet, over time leading to the emergence of chronic diseases. This results in high levels of obesity, hypertension, diabetes and hyperlipidaemia in communities.[2] On the basis of a secondary analysis of the South African Health and Demographic survey, Bradshaw and Steyn[3] note that obesity and hypertension emerge as risk factors associated with increasing wealth, while salty food is preferred by the youngest group of blacks and men living in urban areas.

Over-consumption of dietary fats, sugar and salt, and lack of fibre in the diet may lead to a number of chronic diseases, including coronary heart disease and some cancers.[4] The link between diet and chronic diseases such as cancer and cardiovascular disorders has been well recognised worldwide.[5] Overweight and high serum cholesterol levels, hypertension, and osteoporosis (i.e. decreased bone mass) increase the risk of cardiovascular disorders, stroke and bone fracture, respectively.[4]

In a nationally representative survey in 1998 the Department of Health[6] found that 11% of men and 13% of women above 15 years of age either had blood pressure above 160/95 mmHg, or were taking appropriate medication to lower their blood pressure. The highest rates among men were in the white group, followed by the coloured, black and Asian groups, while for women the highest rates were in the coloured group, followed by the black, white and Asian groups. Among whites the hypertension rate was 15.2%, and among blacks 10.3%.

In 1988 the prevalence of obesity (body mass index (BMI) > 30 kg/m^2), in persons aged 15 - 64 years was 44% for black female, 18% for white females, 8% for black males and 15% for white males.[7] As assessed by a national demographic and health survey,[6] this figure appears to have increased over the next 10 years, since approximately 28% of men and 55% of women were obese in South Africa in 1998. In men, overweight (BMI $\geq$ 25 - < 30 kg/m^2) and obesity occur more frequently in the urban setting than in the non-urban setting. White men and the most educated men are the most overweight or obese of all men. In the case of women, overweight patterns do not differ much between urban and non-urban dwellers, although urban women tend to be more obese. Black urban women have the highest rate of obesity, while Asian women have the lowest rate. A number of studies of all ethnic groups have found that obesity is predictive of the development of hypertension and diabetes.[4] Bourne et al.[8] reviewed data on changes in diet and the emergence of obesity related to the emergence of non-communicable

diseases (NCDs) in the black population of South Africa. They found that fat intakes in black urban adults over the age of 15 years have increased from 16.4% to 26.2% of total energy (a relative increase of 59.7%), while carbohydrate intakes have decreased from 69.3% to 61.7% of total energy (a relative decrease of 10.9%) in the past 50 years. The findings call for the control of obesity as a focus of community-based intervention programmes in South Africa.[6]

A dietary study[9] of a representative sample of 983 adult black men and women aged 15 - 64 years resident in the Cape Peninsula found that the macronutrient profile reflected a diet meeting the prudent dietary guidelines, but that it was low in fibre. Mean intakes of vitamins and minerals indicated a nutritionally depleted diet. Comparisons with rural black populations have revealed that the dietary intake of this urbanising study population represents a transitional phase towards a progressively atherogenic Western diet.[9] In the same study Bourne et al.[10] also found that the diet was confined to a relatively narrow range of foods, but there was little evidence of nutrient-empty food intake. In terms of recommendations, insufficient dairy products, fruits and vegetables were consumed, while requirements for intake of cereals and components of the meat and fat groups were met. Disseminating information through the South African food-based dietary guidelines can be an important strategy for public health nutrition.[11]

Wardle et al.[12] investigated an adult population in Britain with regard to nutrition knowledge and food intake. Knowledge was significantly associated with healthy eating, and knowledge was an important factor explaining variations in food choice. Dallongeville et al.[13] found that among urban men in France, nutrition quiz score was associated with specific patterns of food choice and nutrient intake, suggesting that nutrition knowledge influences dietary behaviour. Walker et al.[14] noted that studies of housewives and other groups in Western populations have revealed: (i) a generally high level of claimed or 'perceived' knowledge of nutrition; (ii) a much lower level of accurate knowledge; and (iii) an often unsatisfactory application of correct knowledge. In 1982 Walker et al.[14] studied white, Indian and coloured housewives in South Africa and found that they had a fair knowledge of the identity of most nutritional components, while their knowledge of good sources of these components and of foods commendable for body building, energy and slimming, or of those which promote fattening, was only moderately satisfactory. Misconceptions were similar to those reported elsewhere.[14] A more recent study by Anderson and Coertze[15] among white middle-income women in urban South Africa found that they lacked nutritional labelling knowledge. Questions that were well answered (over 60% correct) included knowledge of types of sugars, definition of the term 'enriched', and recommended daily intake of dietary fibre; poorly

answered questions included knowledge of the order ingredients were listed in, the cholesterol content in margarine, whether vegetable oils are saturated, and composition and pesticide residue in 'organic' foods.

Since little is known regarding nutrition knowledge in South African populations, the aim of the study was to investigate gaps in the public's nutrition knowledge, and the relationship between nutrition knowledge and sociodemographic characteristics in an urban black and white South African population.

It is useful to investigate this area in order to answer questions pertaining to this urban South African sample such as: (i) what is the level of nutritional knowledge (specifically regarding dietary recommendations, the relationship between diet and disease and sources of nutrients)?; and (ii) is there a difference in level of nutritional knowledge between blacks and whites, males and females and between different educational levels?

Methods

Sample and procedure

Subjects included 90 blacks and 90 whites living in formerly white (Polokwane) and black (Seshego) urban areas in the Limpopo Province of South Africa. The participants were chosen by a 1-in-35 systematic random telephone sampling, excluding non-residential numbers, from the telephone directory. In the residential areas under study almost all whites and the majority (about 70%) of blacks have a telephone. A research assistant trained in interviewing made telephone calls until 90 black and 90 white participants were identified. An adult member of each sampled household aged 18 years or older was randomly selected to participate by selecting the eligible household member whose most recent birthday was closest to the date of interview. Selection bias was reduced by also making phone calls after working hours and on Saturdays in order to reach more participants. The response rate among blacks was 98%, and among whites, 92%. Informal informed consent was obtained, and participants were assured of complete anonymity. The study was conducted in 2001.

Measures

A recently developed 45-item general nutrition knowledge questionnaire for adults[16] was used. The questionnaire covers current dietary recommendations, sources of nutrients, everyday healthy food choices and diet-disease relationships. These four areas underlie the main aspects relating knowledge to dietary behaviour: (i) do people know what current expert dietary recommendations are? (ii) do they know which foods provide the nutrients referred to in the recommendations? (iii) can they choose between different foods to identify the healthiest ones?; and (iv)

do they know what the health implications are of eating or failing to eat particular foods?

The four sections cover in detail:

1. Experts' recommendations regarding healthy eating (four items). Diet recommendations included the following questions: (*i*) Do you think health experts in South Africa recommend that people should be eating more, the same amount, or less vegetables, sugary foods, meat, starchy foods, fatty foods, high-fibre foods, fruits, salty foods? (the food-based dietary guidelines for South Africa recommend making starchy foods the basis of most meals, eating plenty of fruit and vegetables, eating fats sparingly, using salt sparingly, eating dry beans, peas, lentils and soya often; and that meat, fish, chicken, milk and eggs can be eaten every day)[17]; (*ii*) How many servings of fruit and vegetables a day (one serving could be, for example, an apple or a handful of chopped carrots) do you think experts are advising people how to eat in South Africa? (South African recommendation is daily intake of five portions (400 g) of vegetables and fruits)[18]; (*iii*) Which fat do experts say is most important for people to cut down on in South Africa (saturated fat)[19]; and (*iv*) What version of dairy foods do experts say people should eat in South Africa? (lower fat).[19]

2. Knowledge about nutrient content of different foods (21 items). Experts classify foods into food groups. We were interested to see whether people are aware of what foods are in these groups. For example: Do you think these (bananas, unflavoured yoghurt, ice-cream, etc.) are high or low in added sugar?

3. Everyday choices of healthy food (10 items). For example: Which kind of sandwich do you think is healthier — two thick slices of bread with a thin slice of cheddar cheese filling, or two thin slices of bread with a thick slice of cheddar cheese filling?

4. Links between diet and disease (10 items). For example: Are you aware of any health problems or diseases that are related to a low intake of fibre?

Subscale scores can be generated as well as a total nutrition knowledge score. No norms exist to determine an adequate nutrition knowledge score.[12]

The original general nutrition questionnaire was based on the nutrition situation/dietary practices or food habits in Britain. Parmenter and Wardle[16] state that a nutrition knowledge questionnaire developed in the Netherlands would not necessarily be valid for a UK population because of cultural variations in eating habits and precise dietary recommendations. Therefore, for this South African study some of the food items were changed and adapted to the South African context, namely regarding source of nutrients ('tomato ketchup' was changed to 'spicy tomato sauce'; 'kippers' was changed to 'salted and smoked fish';

'mackerel' to 'fatty fish'; 'liver pate' to 'minced liver', 'quiche' to 'seafood'); and choosing foods ('muesli bar' to 'cereals/fruit snacks'; 'whole meal crackers' to 'whole wheat baked bread'; 'Edam' to 'Melrose', 'Stilton' to 'Gouda', and 'gammon' to 'hamburger' with pineapples.

Sociodemographic questions covered age, gender, race, work status, occupation, partner's occupation, level of education, marital status, and number of children. Questions were also included about specialist nutritional training and specific dietary requirements.

The questionnaire was tested on a pilot sample of 10 blacks and 10 whites who did not form part of the final sample of the study. The internal consistency for each subscale was determined using Cronbach's alpha as follows: diet recommendations 0.74, sources of nutrients 0.70, choosing everyday food 0.68, and diet-disease relationship 0.79.

Results

Table I indicates the biographical data of the sample.

The majority of participants were between 18 and 30 years old, followed by those above 40 years and between 31 and 40 years. While most blacks (64.4%) were single/divorced/ separated/widowed, most whites (64.4%) were married or staying with a partner. Almost two-thirds of the whites and half of the blacks were employed full time. The majority of the participants were living with children under 18 years of age, and the majority had secondary school education. More whites (18.4%) than blacks were on a special diet (12.4%).

Table II indicates the nutrition subscale knowledge of blacks and whites.

Both blacks and whites seem to have a reasonable knowledge of dietary recommendations and sources of nutrients, but less knowledge of the diet-disease relationship and choosing healthy everyday foods. Whites have significantly more nutrition knowledge than blacks on all four subscales, especially for sources of nutrients and diet-disease relationship. Participants reported weak knowledge (less than 35% of the respondents gave the correct answer) of sources of nutrients, i.e.: (*i*) high fat in scotch egg; (*ii*) high fibre/roughage in bananas; (*iii*) low saturated fat in sunflower margarine; (*iv*) minced liver as a non-healthy alternative to red meat; (*v*) disagreeing that there is more protein in a glass of whole milk than in a glass of skimmed milk; (*vi*) disagreeing that polyunsaturated margarine contains less fat than butter; (*vii*) olive oil as a type of oil that contains mostly monounsaturated fat; (*viii*) that fat has the most calories for the same weight; and (*ix*) that polyunsaturated fats are mainly found in vegetable oil. Concerning the choice of healthy food, respondents had weak knowledge (less than 35%) on two items: (*i*) banana with plain yoghurt would be the

Table I.	Biographical data for the study groups			
	Blacks		**Whites**	
Group of study	*N*	%	*N*	%
Sex				
Male	41	45.6	37	41.1
Female	49	54.4	53	58.9
Age (years)				
18 - 30	53	59.5	46	51.6
31 - 40	17	19.1	15	16.9
> 40	19	21.3	28	31.5
Pearson's chi-square = 2.70, df = 3, *p*-value 0.440				
Marital status				
Married/staying with partner	31	35.6	56	64.4
Single/divorced/separated/widowed	56	64.4	31	35.6
Pearson's chi-square = 14.37, df = 1, *p*-value 0.000**				
Employment status				
Employed full time	41	46.6	62	68.9
Employed part time	21	23.9	4	4.4
Unemployed	5	5.7	1	1.1
Student	17	19.3	15	16.7
Full-time homemaker	3	3.4	2	2.2
Retired	1	1.1	6	6.7
Children				
One child	33	36.7	24	26.7
Two children	11	12.2	21	23.3
Three children	5	5.6	10	11.1
Four children	2	2.2	6	6.7
More than four	2	2.2	2	2.2
No children	37	41.1	27	30.0
Living with children under 18 years				
Yes	42	47.7	43	48.9
No	46	52.3	45	51.1
Pearson's chi-square = 9.78, df = 5, *p*-value 0.880				
Education				
Primary school	8	9.4	4	4.9
Secondary school	28	32.9	35	42.7
Technical/trade certificate	17	20.0	16	19.5
Diploma	22	25.9	17	20.7
Degree	7	8.2	7	8.5
Postgraduate degree	3	3.5	3	3.7
Pearson's chi-square = 2.73, df = 5, *p*-value 0.742				
On special diet				
No	78	87.6	68	75.6
Yes	11	12.4	22	18.4
Pearson's chi-square = 4.35, df = 1, *p*-value 0.037*				

*Significant *p*-value < 0.05, **p < 0.001.

best choice for when 'a person felt like something sweet, but was trying to cut down on sugar', and (*ii*) strawberry yoghurt is the healthiest pudding.

Dietary recommendations

Concerning the question 'Do you think health experts recommend that people in South Africa should be eating more, the same amount, less or not sure, for the following food groups' most participants mentioned more vegetables and fruit, and less fatty, salty and sugary foods. However, only a quarter said that according to experts the most important food for people in South Africa to cut down on is 'saturated fat'.

Blacks indicated that experts advise people in South Africa to eat on average 2.5 servings of fruits and vegetables per day, while whites said 3.0 servings a day, which is far below the recommended 5 servings (Table III).

Table IV shows the first five questions of the subscale on knowledge of diet-disease relationships.

Two-thirds of the participants related fat intake to the development of high blood pressure, about half related sugar intake to the development of diabetes, and more than one-third related salt intake to heart problems and hypertension. There were a number of misconceptions,

Table II.	Mean comparison of general nutrition knowledge between black and white adults						

| Knowledge selection | Blacks | | Whites | | | | |
(maximum score)	Mean	SD	Mean	SD	t-value	df	p-value
Dietary recommendations (11)	6.9	2.1	7.7	1.4	−2.44	119	0.016
Sources of nutrients (69)	32.7	6.5	37.2	5.8	−4.06	111	0.000
Choosing everyday foods (10)	3.0	1.5	3.9	1.2	−2.84	155	0.005
Diet-disease relationship (20)	6.5	4.0	10.5	3.1	−6.32	105	0.000
Total nutrition knowledge (110)	49.9	9.2	59.8	8.5	−4.21	46	0.000

SD = standard deviation.

Table III.	Dietary recommendations by race (%)

Items	Blacks	Whites
Eat (more)* vegetables	93	97
Eat (less) sugary foods	69	80
Eat (the same amount of) meat	29	36
Eat (same) starchy foods	24	26
Eat (less) fatty foods	81	88
Eat (more) high-fibre foods	52	78
Eat (more) fruit	90	90
Eat (less) salty foods	77	77
The most important to cut down (saturated fat)	20	29
Dairy products one should eat (lower fat)	60	77
Servings of fruit and vegetables per day (mean, SD)	Mean = 2.5 (SD = 1.1)	Mean = 3.0 (SD = 1.5)

*Correct answer considered here for calculations, from four options.
SD = standard deviation.

Table IV.	Five knowledge on diet-disease relationship items by race

Are you aware of any major health problems or diseases that are related to:	Blacks N (%)	Whites N (%)	If yes, which ones: in descending order of most frequently mentioned:
Low intake of fruit and vegetables	43 (47.8)	41 (45.6)	Scurvy, rickets/bone deformity, malnutrition, poor eyesight, blindness, cancer, depression, diabetes
Low fibre intake	26 (28.9)	34 (38.2)	Stomach problems/constipation, rickets, hypertension
Sugar intake	53 (58.9)	45 (50.0)	Diabetes, heart problems, nausea-gall
Salt intake	35 (38.9)	41 (45.6)	Heart problems/hypertension, asthma, weak bones/teeth
Fat intake	53 (61.6)	60 (68.2)	High blood pressure/hypertension, weight problems, diabetes

e.g. as a consequence of low intake of fruit and vegetables the following diseases were mentioned: scurvy, rickets/bone deformity, malnutrition, poor eyesight, blindness, cancer, depression, and diabetes (only cancer and diabetes are correct). The World Health Organisation (WHO)[20] considers low fruit and vegetable intake as a risk factor for the development of cardiovascular diseases and certain cancers, principally of the digestive system.

Table V compares nutrition knowledge between black and white men.

There were no significant differences in nutrition knowledge between black and white men except that

Table V.	**Mean comparison of general nutrition knowledge between black and white men**						
	Black		**White**				
Variables	**Mean**	**SD**	**Mean**	**SD**	*t*-**value**	**df**	*p*-**value**
Dietary recommendations	6.9	2.1	7.0	1.9	−0.14	28	0.888
Source of nutrients	32.6	6.0	35.5	5.6	−1.73	40	0.091
Choosing everyday foods	3.2	1.7	3.7	1.5	0.96	39	0.344
Diet-disease relationships	6.7	3.7	9.6	3.2	−2.99	47	0.004
Total nutrition knowledge	50.9	8.4	56.1	10.5	−1.18	19	0.259

SD = standard deviation.

white men had more knowledge of diet-disease relationships than black men.

Table VI compares nutrition knowledge between black and white women.

White women had significantly more nutrition knowledge across all four subscales, particularly for diet-disease relationships, than black women.

There were no significant gender differences among blacks for total nutrition knowledge ($t = 0.33$, p = NS). There were also no differences between white men and women ($t = 1.16$, p = NS).

Table VII indicates the intercorrelations between the nutrition knowledge subscales.

Dietary recommendations were significantly positively associated with sources of nutrients and diet-disease

relationships but not with choosing healthy everyday foods. Awareness of dietary recommendations is reflected in the knowledge of food sources related to the advice, that is, which foods contain which nutrients and awareness of diet-disease associations. Dietary recommendations do not seem to be used in making dietary choices (practical and healthy food choices).

When intercorrelations between the nutrition knowledge subscales were analysed separately for blacks and whites, it was found that for blacks dietary recommendations were only associated with source of nutrients, and for whites dietary recommendations were only associated with diet-disease relationships.

Table VIII indicates the correlations between nutrition knowledge subscales and biographical variables for blacks and whites.

Table VI.	**Mean comparison of general nutrition knowledge between black and white women**						
	Black		**White**				
Variables	**Mean**	**SD**	**Mean**	**SD**	*t*-**value**	**df**	*p*-**value**
Dietary recommendations	6.8	2.1	7.9	1.2	−2.64	68	0.010
Source of nutrients	32.7	7.2	38.0	5.8	−3.12	41	0.003
Choosing healthy everyday foods	3.4	1.3	4.0	1.1	−2.48	69	0.016
Diet-disease relationships	6.4	4.3	10.9	3.0	−5.46	77	0.000
Total nutrition knowledge	48.7	10.3	60.7	7.7	−3.51	14	0.003

SD = standard deviation.

Table VII.	**Intercorrelations between the general nutrition knowledge subscales for blacks and whites**			
Nutrition knowledge subscales	**Dietary recommendations**	**Sources of nutrients**	**Choosing healthy everyday foods**	**Diet-disease relationships**
Dietary recommendations	1.00			
Source of nutrients	0.38‡	1.00		
Choosing everyday foods	0.04	0.29†	1.00	
Diet-disease relationships	0.25*	0.45‡	−0.03	1.00

*Correlation is significant at the 0.05 level (2-tailed); †$p < 0.01$; ‡$p < 0.001$.

Table VIII.	Correlations between general nutrition knowledge subscales and biographical characteristics				
Biographical variables	**Dietary recommendations**	**Sources of nutrients**	**Choosing healthy everyday foods**	**Diet-disease relationships**	**Total knowledge**
Gender	0.16	0.19*	0.14	0.14	0.22
Age	0.17	−0.09	−0.11	0.08	−0.08
Marital status	−0.29†	−0.18*	−0.12	−0.28†	−0.19
Educational level	0.21*	0.14	−0.06	0.22*	0.27*
On special diet programme	0.09	0.23*	0.05	0.01	0.18

*Correlation is significant at the 0.05 level (2-tailed); †$p < 0.01$.

Female gender was associated with more knowledge of sources of nutrients, but not with the other subscales. Being married or living with a partner was associated with knowledge of dietary recommendations, sources of nutrients, and diet-disease relationships.

Educational level was significantly positively associated with total nutrition knowledge, especially dietary recommendations and diet-disease relationships. When analysing blacks and whites separately, educational level among blacks was only associated with dietary recommendations, and among whites only with diet-disease relationships. Being on a special diet was only associated with sources of nutrients for blacks but not for whites.

Discussion

Both blacks and whites seem to have a reasonable knowledge of dietary recommendations and sources of nutrients, but less knowledge of diet-disease relationship and choosing healthy everyday foods. Whites have significantly more general nutrition knowledge than blacks. The low levels of nutrition knowledge among blacks may be explained by the large (historical) disparities between black and white South Africans.

Considering that South Africa is facing an epidemiological transition, particularly among urban black South Africans, with increases in diet-related non-communicable diseases and dietary changes, the latter need to be targeted for nutrition education.

Although there was no significant difference when comparing black and white men on general nutrition knowledge, black women had significantly lower nutrition knowledge than white women. Considering that the educational level of white and black women in this sample was not significantly different (χ^2=1.658, NS), black women in particular need to be targeted for nutrition education. Moreover, all groups had low scores for choosing healthy everyday foods. The implementation of the Food Based Dietary Guidelines may be a good way to focus on the nutrition education

needed to identify between different foods the healthiest ones.

The total nutrition knowledge score (mean of 53.5) for this South African sample was lower than that of black South African university students (mean of 58.4)[21] and British computer science students (mean of 60.1).[16]

In this South African sample the knowledge score on dietary recommendations was significantly positively associated with the knowledge score of sources of nutrients and diet-disease relationships but not with choosing healthy everyday foods. It seems that dietary recommendations are not used to make healthy dietary choices. Walker et al.[14] also noted that studies of housewives and other groups in Western populations often showed that there is unsatisfactory application of correct knowledge.

More whites (18.4%) than blacks (12.4%) were on a special diet. However being on a special diet was only associated with knowledge of sources of nutrients among blacks. This means that there is a lack of nutrition health education for people who are on a special diet programme, especially among whites. Such nutrition health education could be based on the standard nutrient proportion. Further studies could ask about the proportion of carbohydrates, fat, and protein in order to assess understanding of the standard nutrient proportion. Moreover, the actual dietary practice should be investigated and compared with nutrition knowledge and other variables.

Educational level was significantly positively associated with total nutrition knowledge, especially dietary recommendations and diet-disease relationships, but not with sources of nutrients and choosing healthy everyday foods. Dietary recommendations were also not associated with choosing healthy everyday foods, which may indicate that choosing everyday foods may not be influenced by awareness but, as suggested by Steptoe et al.,[22] by other motivational factors in food choice. Therefore attitudes and beliefs associated with healthy eating could be studied further using relevant theoretical frameworks such as the health belief model and the

transtheoretical model of change. For example, Glanz et al.[23] have described psychosocial factors influencing fat and fibre consumption, including belief in the link between diet and disease, perceived benefits and barriers to behaviour change, social support, social norms, motivation and self-efficacy.

Limitations

The study used a nutrition knowledge questionnaire developed and validated in a population in the UK. Some changes were made to accommodate the different food habits for this urban South African population probably accustomed to a Western diet. However, especially for rural and culturally diverse populations in South Africa, eating habits need to be assessed and dietary recommendations may need to be developed so as to measure nutrition knowledge, including for example more foods that are specifically South African or African. Love et al.[11] found that the South African food-based dietary guidelines created some confusion among a sample of middle-income South African women regarding certain terminology and concepts, such as the terms 'legumes', 'foods from animals', and 'healthier snacks', but conclude that it may be possible to use one set of dietary guidelines for different ethnic groups provided that these guidelines are accompanied by explanatory information citing commonly eaten foods and practical examples of how to implement the guidelines.

Further, the sample was small, from one geographical area, and based on a telephone survey, so the findings cannot be generalised.

Conclusion

This study determined average nutritional knowledge, and identified gaps in nutritional knowledge such as in choosing healthy foods and diet-disease relationships. Results give insight into culturally diverse nutritional knowledge, with practical implications for dietary health promotion considering the South African dietary recommendations. As nutrition knowledge levels have been found to be low among blacks they should be specifically targeted, especially regarding choosing healthy foods and diet-disease relationships. Further,

the relationship between nutritional knowledge and dietary behaviour should be studied in South Africa to further inform intervention programmes.

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