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University of Zimbabwe

Nutrition knowledge and food choice among black students in South Africa

K PELTZER

Abstract

Objectives: To investigate the relationship between nutrition knowledge and dietary behaviour, and to assess the perceived influences on food selection among Black students in South Africa.

Design: Cross sectional study.

Setting: University of the North and two semi-urban Secondary Schools.

Subjects: 213 second year social science university students, 104 (48.2%) male and 112 (51.9%) female, and 199 Grade 11 secondary school students, 67 male (32.7%) and 132 female (66.3%).

Main Outcome Measures: A General Nutrition Knowledge Questionnaire and a Food Choice Questionnaire.

Results: Generally, students seemed to have below average nutrition knowledge levels. University students had significantly more nutrition knowledge than secondary school students. Dietary recommendations were associated with source of nutrients and diet-disease relationships, and sources of nutrients were associated with diet-disease relationships. Choosing everyday foods was not associated with dietary recommendations, source of nutrients, and diet-disease relationships. Among both university and secondary school students the three highest food choice factors included health, sensory appeal and mood.

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Conclusion: Below average nutrition knowledge levels were found. Choosing everyday food was not associated with nutrition knowledge, and food choice was not only influenced by health but also sensory appeal and mood.

Introduction

The link between diet and chronic diseases such as cancer and cardiovascular disorders has been well recognised world-wide.¹ 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.²

The prevalence of obesity, in the age group 15 to 64 years, in 1988 in South Africa for black females was 44%, white females 18%, black males 8% and white males 15%.³ As assessed by a national demographic and health survey, this seems to have increased over the next 10 years, since approximately 28% of men and 55% of women were obese in South Africa. In men, overweight 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. For women, the overweight patterns do not differ much between urban and non-urban, although urban women tended to be more obese. Women with the lowest level of education seemed to be the most obese, although this may be a function of age. The African urban women have the highest rate of obesity, while Asian women have the lowest rate. Obesity has been found in a number of studies in all ethnic groups to predict the development of hypertension and diabetes. The findings call for the control of obesity as a focus of community-based intervention programmes in South Africa.⁴

Many South Africans consume too many calories and too much fat (especially saturated fat), cholesterol, and sodium. Large meals consisting of high-kilojoule foods, and between-meal snacks, are the two dietary habits which are most often responsible for obesity in individuals and families. Ignorance of the kilojoule value of various foods is to some extent a contributory factor, so is poverty, for families with limited incomes have to buy cheap foods and as these usually consist of carbohydrates they are more likely to lead to overweight than proteins. They also consume insufficient complex carbohydrates and fibre. Such diets are one cause of high rates of obesity and diseases such as heart disease, high blood pressure, stroke, diabetes, and some forms of cancer. Recommendations to restrict salt and fat intake and increase complex carbohydrate and fibre consumption are central tenets in public health nutrition guidelines.^{2,5}

Despite the intuitive appeal of education as a means of improving diet, many studies in this area have failed to find significant associations between nutritional knowledge and dietary behaviour.⁶ If these conclusions are correct and knowledge has little or no impact on dietary behaviour, then the implications for public education to improve people's diet are important.⁷

Gracey, Stanley, Burke *et al.*⁸ studied nutritional knowledge, beliefs and behaviours among Australian

secondary school students, and found that ignorance about the nutrient content of food was recognized as a barrier to change, especially by girls, and the reality of this concern was apparent in responses to nutrition knowledge questions. Wardle, Steptoe, Bellisle *et al.*⁹ studied health dietary practices among European university students. The level of the five healthy dietary habits examined was low. Significant univariate associations with healthy dietary habits were identified for gender, weight, dieting status, dietary health beliefs, nutrition knowledge, and health locus of control.

Steptoe, Pollard and Wardle¹⁰ indicate that effective modification of dietary patterns depends on an understanding of the factors governing food choice. Factors influencing food choice and consumption may include taste or sensory appeal, 'healthy' diet, weight control diet, stress and negative emotion. A more effective implementation of health promotion strategies may depend on the recognition of the status of health in comparison with other motives in the selection of food.¹⁰

The aim of the study was to investigate the relationship between nutrition knowledge and dietary behaviour; and to assess the perceived influences on food selection among black students in South Africa.

Materials and Methods

Students filled in the questionnaires in the presence of three research assistants and were free to ask questions for clarification. No time limit was given, but on average students took 30 to 40 minutes to answer all questions. Permission for the study was obtained from the Superintendent-General of the Provincial Department of Education and the respective school authorities as well as consent from the students.

The questionnaires used were:

A 59 item General Nutrition Knowledge Questionnaire for Adults.⁷ It consisted of five sections:

- (1) diet recommendations (four items).
- (2) sources of nutrients (21 items).
- (3) choosing everyday food (10 items).
- (4) diet-disease relationship (10 items).
- (5) sociodemographic data (12 items).

The original questionnaire was based on nutrition in Britain. Therefore, some of the food items were changed and adapted to the South African context. The questionnaire was tested on a pilot sample of 10 university and 10 secondary school students who did not form part of the final sample of the study. The internal consistency for each sub scale was using Cronbach's alpha as follows: diet recommendations: .71, sources of nutrients: .66, choosing everyday food: .72, and diet-disease relationship: .75.

A 36 item Food Choice Questionnaire.¹⁰ It consisted of nine factors:

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A 36 item Food Choice Questionnaire.¹⁰ It consisted of nine factors:

- (1) health-related statements called health (six items).
- (2) items concerning stress, coping and mood = mood (six items).
- (3) ease of food purchase and preparation = convenience (five items).
- (4) appearance, smell and taste = sensory appeal (four items).
- (5) the use of additives and natural ingredients = natural content (three items).
- (6) cost of food = price (three items).
- (7) consumption of low calorie food = weight control (three items).
- (8) familiarity (three items), and (nine) items concerned with environmental and political considerations = ethical concern (three items).

Participants were asked to endorse the statement "It is important to me that the food I eat on a typical day..." for each of the 36 items by choosing between four responses: not at all important, a little important, moderately important and very important, scored from one to four. The questionnaire was tested on a pilot sample of 10 university and secondary school students who did not form part of the final sample of the study. Cronbach alpha for the total Food Choice Measure was .74.

Data were analysed using descriptive, comparative, t-test and correlational statistics using the Statistical Package for the Social Sciences for Windows (SPSS-PC, version 8.0 for windows).

Results

Sample.

The sample included 213 second year social science university students from University of the North, 104 (48.2%) male and 112 (51.9%) female, and 199 Grade 11 secondary school students from two semi urban schools, 67 male (32.7%) and 132 female (66.3%). All students were black African. All university students lived in residences; most male students take main meals in a student canteen (with no food choice) and most female students cook for themselves in the residences. All secondary school students were not provided with meals at their schools but had their meals at home or carry packed meals from home to school.

Table I indicates the demographic characteristics of the study population.

Most of the university students (57.9%) were between 20 to 30 years old and most of the secondary school students (84.9%) were between 14 to 19 years old. About 16% of both university and secondary school students were on a special diet.

Nutrition Knowledge.

Table II indicates the nutrition subscale knowledge by educational status.

Generally, students seemed to have below average nutrition knowledge levels. University students had significantly more nutrition knowledge than secondary school students on all four nutrition knowledge subscales. There were no significant gender differences for any of the nutrition knowledge subscales among secondary and

university students, except for female university students knowing more about dietary recommendations than male students ($t = -2.11, p < .031$).

Table III compares sources of nutrition knowledge for secondary and university students.

Table I: Biographical data of the study groups.

Group of study	University students.		Secondary school students	
	n	%	n	%
Sex				
Male	104	48.2	67	32.7
Female	112	51.9	132	66.3
Total	216	100	199	100
Age (year)				
11-19	72	33.0	169	84.9
20-30	125	57.9	25	12.6
31-40	14	6.5	0	0
Missing	5	2.3	5	2.5
On special diet				
Yes	34	15.7	35	17.6
No	172	79.6	153	76.9
Missing	10	9.5	11	5.5

Table II: The mean comparison of general nutrition knowledge between the university students and secondary school students.

Nutrition knowledge subscales (max score)	University students		Secondary school students		t-value	p-value
	mean	s.d	mean	s.d		
Dietary recommendations (13)	6.57	2.16	4.57	1.79	7.46	.000
Source of nutrients (39)	34.37	7.21	28.12	6.70	7.48	.000
Choosing everyday foods (10)	4.72	1.48	4.28	1.65	2.60	.010
Diet-disease relationships (23)	9.82	4.72	7.42	3.36	3.02	.003
Total nutrition knowledge (115)	58.39	10.39	44.15	10.98	4.64	.000

Table III: The descriptive scores of knowledge about sources of nutrients.

Knowledge source of nutrients (max score 69)	University students			Secondary school students		
	Mean (min, max)	s.d		mean (min, max)	s.d	
Sugar (6)	3,13	(0,6)	1,21	3,02	(0,5)	1,26
Fat (10)	5,88	(0,10)	1,73	4,63	(0,9)	1,82
Starch (6)	4,26	(0,6)	1,50	3,03	(0,6)	1,48
Salt (6)	3,41	(0,6)	1,41	2,50	(0,6)	1,28
Protein (6)	3,04	(0,6)	1,40	2,57	(0,6)	1,06
Fibre/roughage (10)	5,06	(0,10)	2,24	3,92	(0,9)	2,01
Vitamins, minerals and others (25)	8,79	(0,17)	3,00	7,76	(0,15)	2,95

University students seemed to have above average knowledge on the source of nutrients of starch and fat, average knowledge about salt, sugar, protein and fibre roughage, and below average knowledge on vitamins, minerals and others. Secondary school students had average knowledge about sugar, starch, fat, salt and protein, and they had below average scores on the sources of nutrition knowledge vitamins, minerals and others as well as fibre or roughage.

Table IV indicates the intercorrelations between the nutrition knowledge subscales.

Table IV: The intercorrelations between general nutrition knowledge subscales.

Nutrition knowledge subscales	Dietary recom.	Sources of nutrients	Choosing everyday foods	Diet-disease relationships
Dietary recommendations	1.000			
Source of nutrients	.501***	1.000		
Choosing everyday foods	.068	.005	1.000	
Diet-disease relationships	.305*	.481***	.143	1.000

*Correlation is significant at the 0.05 level (2-tailed); *** $p < .001$.
recom. = recommendations.

Dietary recommendations were associated with source of nutrients and diet-disease relationships, and sources of nutrients was associated with diet-disease relationships. Choosing everyday foods was not associated with dietary recommendations, source of nutrients, and diet-disease relationships. Being on special diet was not associated with any of the nutrition knowledge subscales.

Food Choice.

Table V indicates the mean comparison of the nine food choices factors for university and secondary school students.

Table V: The mean comparison of food choices between the university students and high school students (rated from 1 = not at all important to 4 = very important).

Food choice factors	University students		Secondary school students		t-value	p-value
	item mean	s.d	item mean	s.d		
Health	3.33	.81	3.12	1.02	3.18	.002
Mood	3.05	1.01	3.01	1.11	-.58	.562
Convenience	2.70	1.31	2.83	1.27	-1.53	.127
Sensory appeal	2.89	1.16	3.18	1.03	-3.34	.001
Natural content	2.83	1.07	2.75	1.05	.95	.345
Price	2.76	1.29	2.88	1.20	-1.34	.180
Weight control	2.80	1.09	2.71	1.12	1.48	.140
Familiarity	2.49	1.22	2.19	1.21	3.22	.001
Ethical concern	2.39	1.32	2.80	1.14	-4.56	.00
Total	2.90	1.14	2.92	1.08	.34	.733

* Significant p-value < .05.

For university students health related statements (M = 3.33) were rated with the highest importance regarding food choice, followed by items concerning stress, coping

and mood (=mood) (M = 3.05), and appearance, smell and taste (= sensory appeal) (M = 2.89).

For secondary school students sensory appeal (M = 3.18) was rated with the highest importance regarding food choice, followed by health (M = 3.12) and mood (M = 3.01). There were also significant differences between university and secondary school students regarding food choice factors; university students had more ethical concern (items concerned with environmental and political considerations), rated the food familiarity, and health as more important than secondary school students, whereas secondary school students rated sensory appeal as more important than university students did. There were no significant gender differences regarding food choice factors among secondary and university students.

Table VI indicates intercorrelations between the different food choice factors.

Table VI: The intercorrelations between food choice questionnaire factors.

Factors	1	2	3	4	5	6	7	8
1. Health	1.00							
2. Mood	.39*	1.00						
3. Convenience	.17	.29*	1.00					
4. Sensory	.21*	.27*	.39*	1.00				
5. Natural	.26*	.30*	.33*	.21*	1.00			
6. Price	.18	.29*	.41*	.34*	.34*	1.00		
7. Weight	.15	.28*	.11	.18*	.07	.07	1.00	
8. Familiar	-.01	-.20*	-.37*	-.33*	-.30*	-.37*	-.12	1.00
9. Ethical	-.02	.15	.26*	.37*	.25*	.27*	.04	-.50*

* Correlation is significant at the 0.001 level (2-tailed).

Most food choice factors were strongly intercorrelated. Health-related items seemed to have weak or no associations with convenience, price, weight, familiar and ethical food concerns, and weight was weakly or not associated with convenience, natural ingredients, and price.

Discussion

Generally, students seemed to have below average nutrition knowledge levels. University students had significantly more nutrition knowledge than secondary school students on all four nutrition knowledge subscales. This seems to indicate that nutrition knowledge may increase with higher educational levels and age.

Dietary recommendations were associated with source of nutrients and diet-disease relationships, and sources of nutrients was associated with diet-disease relationships. Choosing everyday foods was not associated with dietary recommendations, source of nutrients, and diet-disease relationships. This finding seems to confirm that nutrition knowledge (diet recommendations, sources of nutrients, and diet-disease relationships) does not influence the choice of everyday foods. However, food availability, economic factors and cultural factors may also play an important role in choosing everyday food,⁵ which was not studied here but

could be investigated further. The lack of association between nutrition knowledge and choosing everyday foods may further be influenced by other motivational factors in food choice.¹⁰ 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, Kristal, Sorensen *et al.*¹¹ have described measures of psychosocial factors influencing fat and fibre consumption, including items related to beliefs in the links between diet and disease, perceived benefits and barriers to behaviour change, social support, social norms, motivation and self-efficacy.

Being on a special diet was also not associated with nutrition knowledge. This may mean that there is a lack of nutrition health education for people who are on a special diet programme. 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 the understanding about the standard nutrient proportion.

Regarding different food choice factors there were some significant differences between university and secondary school students regarding ethical concerns, food familiarity, health and sensory appeal. Among both university and secondary school students the three highest food choice factors included health, sensory appeal and mood. It should be considered that in particular among male university students food choice was determined by canteen food. A more effective implementation of health promotion strategies should, apart from the recognition of the status of health include motives of sensory appeal and mood in the selection of food.¹⁰ The sensory appeal seemed to be more associated with natural content than artificial ingredients since an association was found between sensory appeal and natural content in the intercorrelation matrix of the food choice factors.

Acknowledgements

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