

The nutritional intake of undergraduates at the University of Zimbabwe College of Health Sciences

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Abstract: In developing countries the cost of treating disease is much more than prevention and so there is now a lot of interest in understanding nutrition. In this pilot study we selected a cohort of pre-clinical students studying at the College of Health Sciences in the University of Zimbabwe. This study was carried to investigate the gender-based weekly consumption of different food categories amongst University of Zimbabwe students. Semi-structured questionnaires distributed to 100 undergraduate students (male= 47; female= 52). The proportion of male and female respondents, age and body weight did not differ significantly. Principal foods consumed by males included sadza and cerevita; naartjies, bananas and avocado pears; tomatoes, onions, covo and spinach; beef; and condensed milk and powdered milk occupied the larger proportions. Females frequently ate a lot of bread, cerevita, sadza and cereal; lemons and avocado pears; onions, tomatoes, rape and covo; beef and soya meat; creamer, powdered milk and milk. This study suggests that females consumed a greater variety of food, including the infrequent types by comparison with men.

Key words: food, gender, nutrition, students, undergraduate, university, Zimbabwe

Introduction

Nutrition of university students has been widely considered globally, although the number of local Africa investigations thereof is limited to studies in Nigeria (Adewusi & Akindahunsi, 1994; Cole & Ogungbe, 1987; Nnanyelugo & Okeke, 1987; Oguntona *et al.*, 1998), Kuwait (al-Shawi, 1992), Ghana (Takyi & Amankwa, 2004), Egypt (Bakr *et al.*, 2002), and South Africa (Shefer, 1987). In Zimbabwe a nutrient estimation of black urban and rural people allowed a food consumption database to be developed (Merchant *et al.*, 2005). Give the rapid deterioration in the quality of life in Zimbabwe from direct political and economic factors life expectancy has fallen dramatically being less than 40 years (Dwyer, 2005).

Zimbabwe is a country with chronic energy deficiency of 4.2% in women (Hindin, 2006) due to an overburdened lifestyle and massive food shortages. Spiralling inflation, economic and political turmoil (Koenig, 2007), and poor grant awards will have a major impact of affordability of purchase of food stuffs. It was important, therefore, to determine the average nutritional intake as one component in the quality of university student life within gender-matched university students. We therefore devised a simple semi-structured questionnaire as an extension of the study by Merchant *et al.* (2005) in order to gauge the balanced diet of students in a university in southern Africa.

There are no original studies on the nutrition of Zimbabwe university students and, as such, our study provided a useful insight into nutrient needs during periods of difficult study. The aim of this study was therefore to investigate the gender-based weekly consumption of different food categories amongst University of Zimbabwe students.

Materials and Methods

Study subjects

A group of 100 students studying Physiology at the University of Zimbabwe were asked to voluntarily complete a structured questionnaire to determine their age, weight, average income, marital status and education. Weight was determined by a simple bathroom scale. Few local studies have been completed on Physiology students and given the stresses incumbent in studying a difficult subject, we wished to explore nutritional status. Students enrolled on courses with a Physiology component include those studying Medicine, BSc Physiotherapy, BSc Occupational Therapy, BSc Nursing and BSc Food and Nutrition. Most (98%) of the students participating entered university study directly from secondary school. They principally resided in the halls of residence based at the Mount Pleasant campus. Institutional and ethical clearance was granted for this study via the university research ethics and the research council of Zimbabwe in support of post-graduate training.

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Food categorisation and frequency of intake

The questions designed were asked in terms of description of food eaten, when and how often based on a categorisation listed in Merchant *et al.* (2005). Students were asked to record from their memory the different types of foods consumed in one week per day within the categories: starch fruit, vegetables, meat and dairy. Beverages and sweets, and baked goods were however omitted because of the massive shortages and infrequency of manufacture and import of these products generally in food stores and supermarkets. Pre-tested open-ended questions were used to determine the student's consumption of an item, from which a weekly estimate was calculated by tally counts. Students were asked to specify at the time, the seasonality of the fruit in terms of what fruits are available in the shops/markets for sale. We did not determine the quantity of food eaten because of the massive food shortages currently experienced in Zimbabwe resulting in biased or inappropriate determinations of quantity of food consumed and its relationship to satiety.

Data analysis

The student's t-test (Microsoft Excel 2003) was used to determine statistical significant between genders and $P < 0.05$ was taken as significant. The overall consumption of each food category (starch, fruit, vegetables, meat and dairy) between male and female respondents was done using the Spearman's rank correlation coefficient test (Minitab 15, Minitab Inc., Philadelphia, USA).

Results

Only one person did not respond. The proportion of male and female respondents, age (male: 22.89 ± 3.88 yr (range: 20-37yr), female: 21.10 ± 1.50 yr (19-27yr)) and body weight (male: 60.75 ± 9.61 kg (range: 55-75kg), female: 59.25 ± 12.82 kg (45-77 kg)) did not differ significantly. The average annual income in males and females was US\$ 5,073.07 and US\$ 26,517.85, respectively. The vast majority of respondents were single (males: 44 in 45; females: 50 in 52) and 4 (males: 3; females: 1) had previous under-graduate degrees.

Table 1: Differences in the number of times (mean \pm SD) food is consumed per week

Category	Item	Males	Females	P
Starch	Bread	5.84 ± 1.87	6.54 ± 1.27	<0.05
	Cereal	4.44 ± 1.84	5.16 ± 1.57	>0.05
	Sadza	6.12 ± 1.76	5.72 ± 1.06	>0.05
	Sweet potato	3.73 ± 1.28	1.54 ± 0.75	<0.05
	Potato	2.40 ± 1.36	3.75 ± 1.28	>0.05
	Rice	2.55 ± 1.13	4.41 ± 1.21	<0.01
	Pasta	1.00 ± 0.00	4.39 ± 1.78	<0.001
	Beans	1.00 ± 0.00	3.00 ± 0.00	<0.001
	Cerevita	7.00 ± 0.00	5.75 ± 1.30	<0.001
Fruit	Banana	2.63 ± 1.25	2.64 ± 1.01	>0.05
	Apple	2.04 ± 1.88	2.67 ± 1.57	>0.05
	Peach	2.00 ± 0.00	3.00 ± 0.00	<0.001
	Guava	2.00 ± 0.00	2.40 ± 0.55	>0.05
	Lemon	1.00 ± 0.00	5.50 ± 1.60	<0.001
	Avocado	2.74 ± 0.14	4.27 ± 1.49	>0.05
	Orange	2.63 ± 1.41	3.63 ± 1.59	>0.05
	Mango	2.00 ± 0.00	3.00 ± 1.83	<0.001
	Naartjie	5.00 ± 1.83	2.00 ± 1.41	>0.05
Vegetables	Rape	1.65 ± 0.32	5.60 ± 1.56	>0.05
	Tomato	7.00 ± 0.00	6.35 ± 1.84	>0.05
	Onion	6.55 ± 1.51	6.64 ± 1.21	>0.05
	Covo	6.28 ± 1.65	5.41 ± 1.31	<0.05
	Bean	3.83 ± 1.64	3.43 ± 1.44	>0.05
	Cabbage	4.99 ± 1.59	4.39 ± 1.72	>0.05
	Lettuce	4.60 ± 1.51	3.50 ± 1.24	>0.05
	Carrot	3.65 ± 1.14	4.90 ± 1.55	>0.05
	Spinach	5.88 ± 1.76	2.67 ± 1.25	<0.05

Category	Item	Males	Females	P
Meat	Beef	4.34 ± 1.14	4.33 ± 1.64	>0.05
	Chicken	2.98 ± 1.23	3.18 ± 1.45	>0.05
	Pork	2.21 ± 1.09	2.00 ± 0.99	>0.05
	Fish	2.88 ± 1.41	1.41 ± 1.09	<0.05
	Eggs	2.50 ± 0.71	1.00 ± 0.00	<0.001
	Soya meat	1.00 ± 0.00	4.00 ± 0.00	<0.001
	Sausage	0.00 ± 0.00	2.45 ± 1.04	<0.001
	Mince	0.00 ± 0.00	5.90 ± 1.33	<0.001
	Mutton	0.00 ± 0.00	1.13 ± 0.24	<0.001
	Dairy	Milk (pasteurised)	3.76 ± 1.87	5.60 ± 1.25
Powdered milk		6.21 ± 1.50	6.60 ± 1.27	>0.05
Condensed milk		7.00 ± 0.00	1.40 ± 0.43	<0.001
Yoghurt		2.21 ± 1.27	1.10 ± 0.77	>0.05
Lacto		1.36 ± 0.66	1.76 ± 0.19	>0.05
Ice cream		1.40 ± 0.04	0.89 ± 0.02	>0.05
Cheese		1.38 ± 0.88	1.70 ± 0.31	>0.05
Chocolate		1.00 ± 0.00	2.70 ± 0.67	<0.001
Creamer		0.00 ± 0.00	7.00 ± 0.00	<0.001

P<0.05 is significant

[Sadza is ground and cooked maize meal; Cerevita is cooked porridge composed of wheat, oats and bran; Naartjie is a tangerine (*Citrus aurantium*); Rape is a leafy vegetable and part of the cabbage family; Covo is mixed cut vegetable leaves principally kale and rape; and Lacto is fresh fermented milk sold commercially]

Although there were clear differences in individualised item consumption between males and females, there were no overall significant differences in consumption of food category. Amongst the principal foods consumed by males, sadza and cerevita; naartjies, bananas and avocado pears; tomatoes, onions, covo and spinach; beef; and condensed milk and powdered milk occupied the larger proportions (Table 1). Females ate significantly more bread, cerevita, sadza and cereal; lemons and avocado pears; onions, tomatoes, rape and covo; beef and soya meat; creamer, powdered milk and milk.

Within each food category there were responses to the following food categories (starch, fruit, vegetables, meat and dairy), although infrequently rated by respondents. Females had a greater proportion of in-frequently rated food items. In the starch category, noodles, yams, egg plant, butternut squash, spaghetti, mahesu (beverage of ground maize and sorghum), cakes, doughnuts and samp (milled rice) were not indicated by any males. In the fruit category, only males indicated consumption of classic cucumbers. Females, however, consumed the following items which were not eaten by men: magaka (wild cucumber), pawpaw, papaya, pears, blackberries, masawu (wild fruit), grapes and kiwi fruit. Males consumed more pumpkin leaves (3.75 rating) vs. females (0.83 rating) and equal portions of mushrooms and salad. However, females only consumed *Cleome spinosa* seeds (annual flower), broccoli, pepper,

cauliflower, chomolia, baby marrow and frozen vegetables. Meat was only in-frequently rated by females who ate liver, matemba (small dried fish, *Limothrissa* spp.) and game meat. There were no in-frequently rated food items by males or females. However, they were still regarded as items consumed by a few people per week and had a bearing on choices of food available/affordable and are listed by category.

Discussion

This study suggested that females consumed a greater variety of food, including the infrequent types, presumably in an attempt to achieve a balanced diet, most probably supplemented by a greater income. In contrary, Nnanyelugo and Okeke (1987) reported a greater energy consumption in men in a study conducted in Nigeria. Although men in the West may prefer warm, hearty, meal-related comfort foods (such as steak, casseroles, and soup), and females instead preferred comfort foods that were more snack related (such as chocolate and ice cream) (Wansink *et al.*, 2003), the current study showed no such correlation. There was still some indication of food choice available in our study, as food consumption by women was significantly greater for chocolate, sausage, mince and mutton, whereas men ate significantly more fish and eggs. Some of the results suggested preference, e.g. men ate significantly more covo and spinach, vegetables rich in vitamin A (Adams-Campbell *et al.*, 1993).

Sadza, being a staple food amongst the black populace in Zimbabwe, was consumed commonly by both sexes, as agreed in Merchant *et al.* (2005). The importance of vitamin C consumption was evidenced in the consumption of citrus fruits by both sexes, although women ate significantly more peaches, lemons and mangos, either by taste or health-preference needs. There was no aversion to the like as has been suggested in a previous study on pre-eclampsia/eclampsia in Zimbabwean women (Atkinson *et al.*, 1998). The greater consumption of soya meat amongst women suggested a healthy alternative source of protein and has been found to lower saturated fat levels in the diet (Ashton & Ball, 2000). The consumption of powdered and condense milk suggested a lower cost and convenience of storage, but may be more readily available than fresh milk. The significantly higher milk consumption in females may possibly be due to their higher cereal consumption, and was unlikely to be related to lactose intolerance (Nnanyelugo, 1984).

It appears from the study that women have a more balanced diet than men and indeed dietary phytoestrogen intake via lignan (Kreijkamp-Kaspers *et al.*, 2007) may be associated with better performance and speed as required in personal tasks performed by women. It is advocated in the literature that a high intake of fruit and vegetables significantly reduced the risk of colon cancer, possibly through the protective action of quercetin (Mouat *et al.*, 2005). In our study there was indication of fruit consumption in both sexes, hence reducing colon disease. Additionally high consumption of fruit and vegetables is associated with reduced risk of ischemic heart disease (Freese *et al.*, 2002) and during a high-vegetable diet intake, quercetin levels rise significantly (Erlund *et al.*, 2002). The higher consumption of soya in women means they are likely to have had rich sources of the isoflavones daidzein and genistein (Liggins *et al.*, 2002). It would have been useful to measure the exact quantity/mass of foods consumed per week.

The current investigation provided a unique insight to the dietary requirements of male and female undergraduate students in Zimbabwe with useful comparisons between male and female participants. We suggest further studies on cost-matched and family/cultural influences on food consumption.

Ideally humans wish to achieve a balanced diet and the components of the like by culture are very important to assess health and well-being. We encourage more studies on University students in Africa, particularly in central and southern parts.

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