

Original Article

Food security, selection, and healthy eating in a Pacific Community in Auckland New Zealand

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When an infant is brought home to the family, it is often a time of emotional, economic and physical stress due to the extra demands placed on parents. Household food security means "access at all times to enough and nutritionally appropriate food to provide the energy and nutrients needed to maintain an active and healthy life". Questions about food security were asked of 1376 Pacific Island mothers (as part of the Pacific Island Family Study) approximately six weeks after the birth of their baby. Due to lack of money food sometimes ran out in 39.8% of households and in a further 3.8% food often ran out. Variety of foods was limited by lack of money in 39.3%. Foods that were still bought when money was limited included bread (97%), milk (95%), meat and chicken (91%), vegetables and fruit (83%), rice or pasta (82%), breakfast cereals (69%), fish or shellfish (50%) and biscuits or chips (44%). Alcohol (1%), soft drinks (11%), ice cream (12%) and fruit juice (21%) were the least often bought. Energy density (MJ/kg) and nutrient-density of typical foods limited by lack of money were analysed. Rice, bread and fatty meats provided the most calories per dollar and fruit and vegetables the least. The best protein-value for money was from minced beef, chicken and tinned tuna and the most fibre-rich foods included baked beans and mixed vegetables. Food security is a major problem for Pacific families. The environment of food availability, choice and cost requires attention to help close the health gap.

Key Words: food security, obesity, Pacific, energy density, diet, costs

INTRODUCTION

Obesity rates in New Zealand have risen sharply over the past decade and more so in the New Zealand Pacific Island population. By 2002, using ethnic-specific BMI cut-off points 56% of New Zealand adults aged ≥ 20 years were classified as overweight (35%) or obese (21%). When analysed by the three major ethnic groups 82% Pacific were overweight or obese: 44% male, 36% female overweight and 36% males and 47% of females obese.¹ The high rates of overweight and obesity are also seen in children, where using Cole cut-offs² to define overweight and obesity, Pacific males (34%, 26%) and females (33%, 31%) had higher rates of overweight and obesity respectively than New Zealand European males (18%, 5%) and females (19%, 6%).³

One reason for rising obesity rates in Pacific Island families in New Zealand may lie in the abundant choices of relatively inexpensive calorie-dense foods that are convenient and taste good. Pacific Island people are over-represented both in the lower income bands, with 61% receiving less than \$20,000 per year in 2001,⁴ and living in areas of greater deprivation (using the deprivation index)⁵ compared to the rest of the population. Consumers with limited resources may select energy-dense diets high in refined grains, added sugars and fats as an effective way to save money.⁶ Buying cheaper foods because of financial constraints is one aspect of food insecurity in addition to

running out of food, running out of money to buy food, skipping meals, experiencing hunger and being unable to buy food. Food insecurity is socially defined and includes problems with the quantity and quality of the food available and uncertainty about the supply of food.⁷ Food insecurity has been associated with unfavourable food choices⁸ and it has been suggested that it may predispose to the development of obesity and subsequent diseases.⁹ Findings from The New Zealand Health Survey¹ shows that in both males and females, the prevalence of obesity was significantly higher in the most deprived quintile than in the least deprived. These findings suggest that food insecurity may play a part in the high rates of obesity in Pacific people.

Therefore the aim of this study was to determine the rate of food insecurity in Pacific Island families and the variety of foods still bought when faced with financial constraints. A secondary aim was to determine the best nutrition value for money food to assist families with financial constraints buy more nutritious foods for their money.

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Manuscript received 27 June 2006. Initial review completed 11 July 2006. Accepted 6 October 2006.

MATERIALS AND METHODS

Approximately six weeks after the birth of their child, mothers were visited in their homes by Pacific interviewers fluent in both English and a Pacific language. Once eligibility criteria were established and informed consent was gained, mothers participated in one-hour interviews concerning the health and development of the child and family functioning. Each interview was carried out in the preferred language of the mother. All procedures and interview protocols had ethical approval from the National Ethics Committee. Questions asked about food security³ all concerned affordability of food: had the responses never, sometimes or often, and are shown in Table 1. Food choices influenced by lack of money were assessed by asking the question: "When your variety of foods have been limited by a lack of money, what are the main foods that you would still buy?" Responses could include as many of the choices from bread, fruit juice, ice-cream, vegetables, rice or pasta, soft drinks, meat, chicken, fish or shellfish, cereals, alcohol, biscuits or chips, fruit, milk and the respondent indicated.

Representative foods of the above choices were se-

lected and priced (2005) from supermarkets and markets in South Auckland where the Pacific Island Family study was based. Food composition and nutrition was considered in relation to the edible portion, number of calories, grams of protein for each dollar spent to determine which food is the best protein value for money and also most nutritious. Foods were ranked according to fibre content as fibre is a surrogate measure of whole grain, fruit and vegetable content. Food composition data was obtained from The Concise New Zealand Food Composition Tables, 6th edition.¹⁰

Descriptive statistics including frequency tables were used to analyse the responses using SPSS 14 for Windows, Chicago, IL.

RESULTS

Food Insecurity

Because of financial constraints in about a third of the 1376 respondents reported occasions when food ran out, less was eaten, variety was limited and others were relied on to provide food (Table 1). Special food grants were utilised in 198 of the 1398 households. Figure 1 shows

Table 1. Distribution of responses to food security questions (N=1398)

Household Food Security Question	% of respondents who answered		
	Never	Sometimes	Often
How often has this been true for you (or your household) over the past year?			
Food runs out due to lack of money	56.6	39.6	3.9
I /we eat less because of lack of money	63.6	33.0	3.4
The variety of foods I am (we are) able to eat is limited by lack of money	60.6	34.5	4.9
I/we rely on others to provide food and/or money for food, for my/our household, when I/we don't have enough money	69.8	27.7	2.5
I/we make use of special food grants or food banks when I/we do not have enough money for food	85.8	13.7	0.4
I feel stressed because of not having enough money for food	65.3	30.3	4.4
I feel stressed because I can't provide the food I want for social occasions	75.7	21.4	2.9

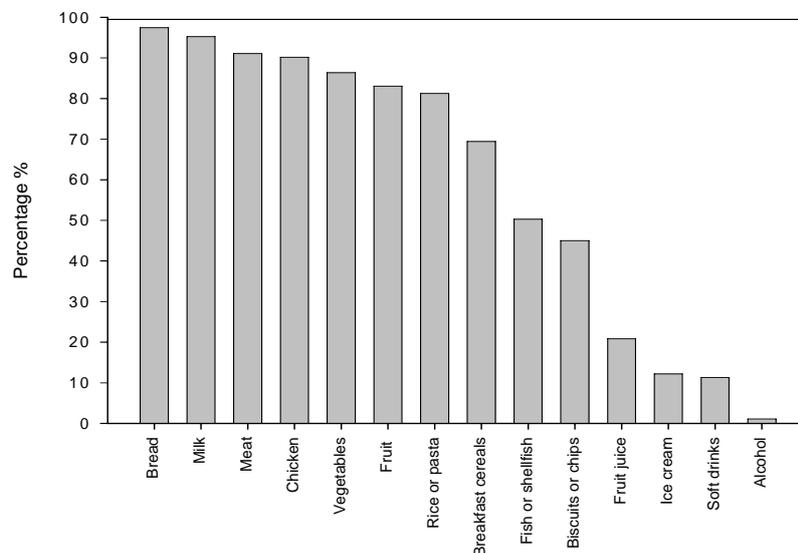


Figure 1. Percentage of respondents who would still buy selected foods when limited by money

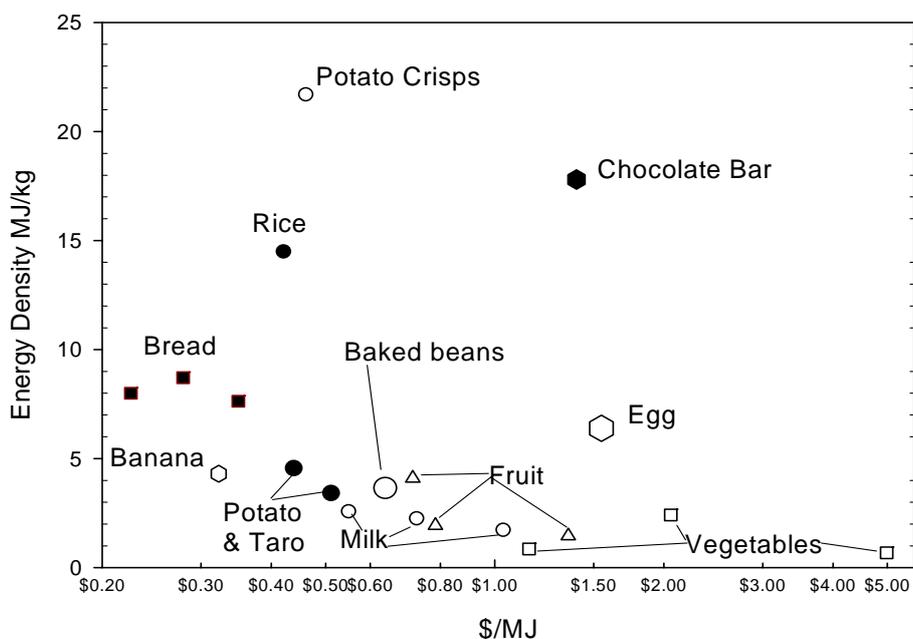


Figure 2. Scatterplot showing the relationship between price (logarithmic scale) and energy density of selected, commonly eaten foods

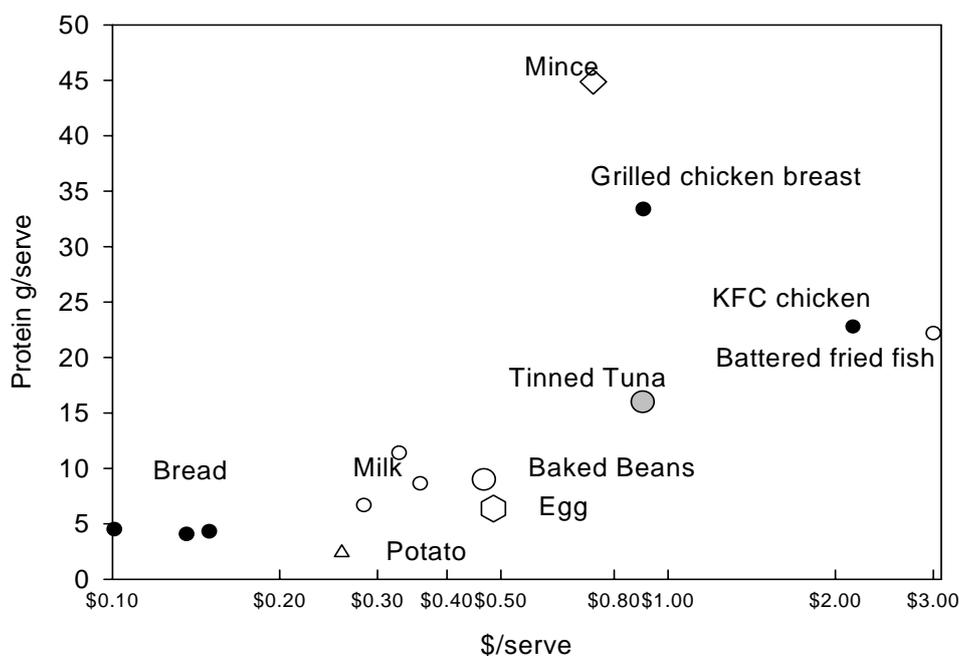


Figure 3. Scatterplot showing the relationship between price per serving (logarithmic scale) and amount of protein in selected foods that provide a large portion of the protein intake of the population

that foods that were still bought included bread (97%), milk (95.4%), meat and chicken (90.5%). Foods less often bought were alcohol (1.1%), soft drinks (11.3%), ice-cream (12.4%) and fruit juice (21%).

Nutrition Choices

An inverse relationship between energy density (MJ/kg) of foods and energy cost (\$/kg) was shown such that energy-dense grains, fats, and sweets represent the lowest-cost calorie dense options to the consumer (Fig 2). When “healthy nutritious” foods defined by the 2006 nutrition profiling model of the Food Standards Agency of the United Kingdom^{11, 12} were analysed by the number of

calories for each dollar paid, foods such as rice, bread and whole grain cereals without added sugar provided the most calories per serving and meat, chicken, and fish the least. But when the cost of the protein in the foods was investigated minced beef, chicken, and canned tuna gave the best protein value for money (Fig 3). Furthermore these items were equivalent in cost per serve to convenience foods such as coated fried chicken and fish. Vegetables, brown breads, wheat cereals and baked beans were found to have at least 10 times more fibre per serve (Fig 4) than other commonly eaten foods such as rice bubbles and noodles.

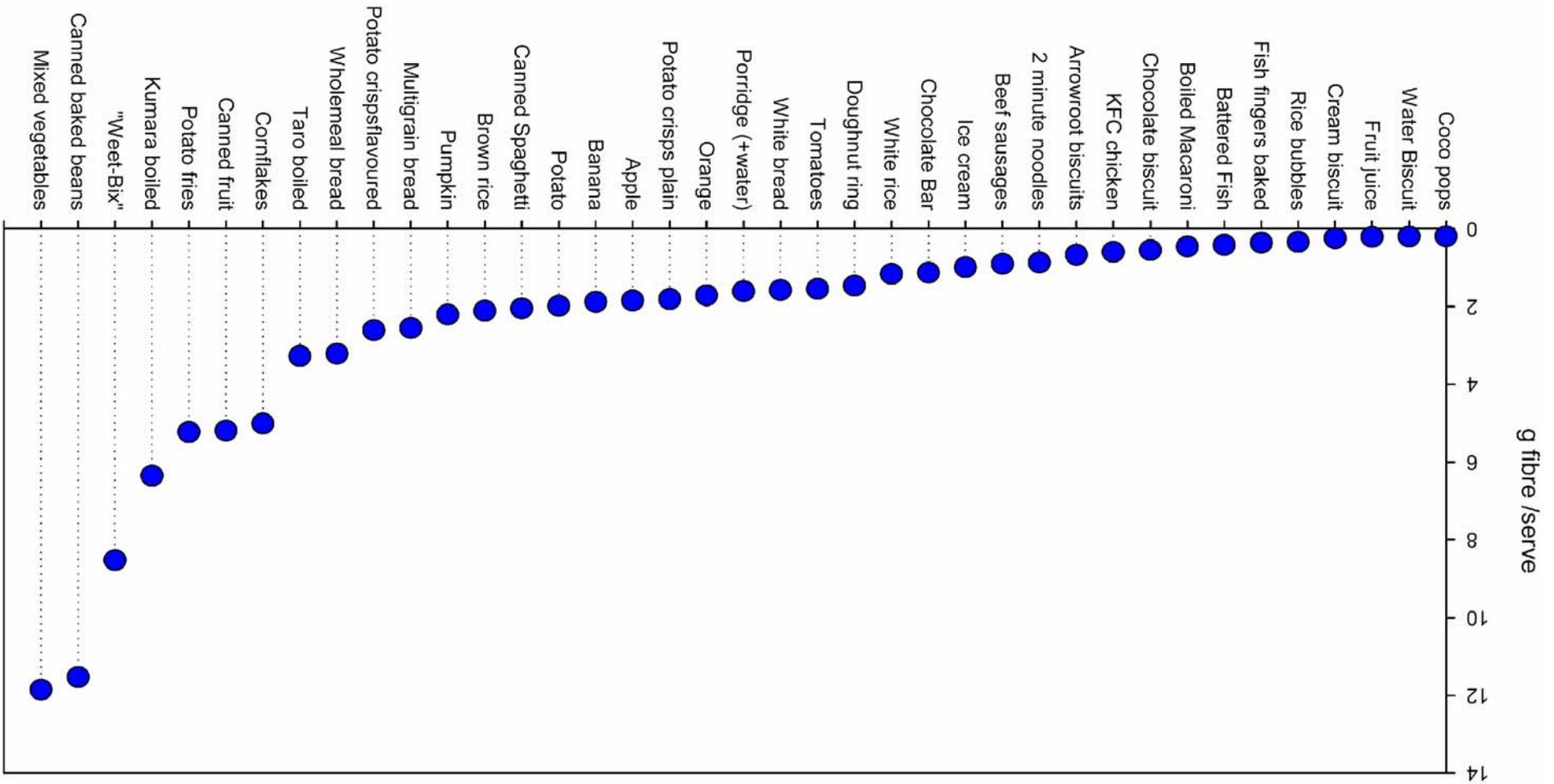


Figure 4. Grams of fibre per standard serve of selected foods

DISCUSSION

Food security by definition incorporates aspects of affordability and accessibility to appropriate food. Results from this study show food insecurity is prevalent in Pacific Island families with 43.6% of families either “sometimes” or “often” run out of food. When there are financial constraints food choices are also limited (39.3%). This finding is in agreement with Parnell *et al.* (2001)¹³ who report in the 1997 National Nutrition Survey that 51% of Pacific males and 49% Pacific females said that food in their house runs out due to lack of money. This is in comparison to NZ Maori (27% and 37%) and NZ European (7% and 11%) for males and females respectively. Also in agreement with our findings, Pacific peoples were also more likely to limit the amount of variety of food due to lack of money (50% of males and 48% of females). Once again this is higher than NZ Maori (47% and 47%) and NZ European (20% and 26%) for males and females respectively. However, Parnell *et al.* (2001)¹³ found that this trend is more apparent in young Pacific adults compared to older people. This is of concern because healthy eating is important in order to prevent future diseases e.g. cardiovascular and diabetes.

Food insecurity is associated with unfavourable food choices⁸ and consumers with limited resources may select energy-dense diets high in refined grains, added sugars and fats as an effective way to save money.⁶ It is therefore possible that Pacific Island families will decide to buy foods that are high in added sugars and fats because they are far more affordable than the recommended “healthy” diets based on lean meats, whole grains, and fresh vegetables and fruit to try and save money. It has been suggested that food insecurity and readily available relatively inexpensive calorie-dense foods may predispose to the development of obesity and subsequent diseases.⁹ However when faced with financial constraints Pacific Island families would more often choose to buy more nutritious foods such as bread, milk, meat and chicken rather than convenience, less nutrient-dense foods such as ice cream, chips, biscuits and alcohol. Despite this evidence of knowledge vegetables and fruit were still bought by only 86.3% and 83.1% respectively. This is of concern as fruit and vegetables surpass many other foods with respect to the number of nutrients-per-calorie.¹⁴

Furthermore, an inverse relationship between energy density of foods and energy cost, such that energy-dense grains fats and sweets represent the lowest-cost dietary options to the consumer is demonstrated in our limited analysis and by others.¹⁵ When the foods limited by financial constraints were analysed by the number of calories for each dollar paid, of the “healthy nutritious” foods, rice, bread and cereal provided the most calories per serving and minced beef, chicken and fish the least. Rice, bread, and cereals have less sugar and the costs were found to be similar per serving to more energy dense foods such as treats including ice cream. This has positive implications for obesity rates. Foods low in sugar content (low glycaemic index) promote fat oxidation¹⁶ and increase post-prandial satiety.^{16,17} Ludwig (1999)¹⁷ found that in obese children who had consumed high glycaemic index breakfasts and lunches had a voluntary food intake

53% higher than those who consumed low glycaemic index foods. BMI¹⁸ and body fatness¹⁶ have been shown to decrease following a low-GI diet in obese adolescents and one study¹⁹ found an beneficial effect on body weight when sugar-sweetened beverages, which account for 10–11% of total energy intake, were removed from the diet. Furthermore, trying to encourage “healthy” eating for low cost requires reducing the availability of energy-dense foods and increasing accessibility to foods with high fibre and protein.

Foods high in protein foods have a high nutrient density whilst being low in energy²⁰ but are also more expensive per calorie than fats, oils, and refined grains.¹⁵ However, in this study, when the cost of the protein in the foods was investigated minced beef, chicken and canned tuna gave excellent protein value for money and were more protein for the same cost per serve as convenience foods such as Kentucky Fried Chicken™ and battered fish. Furthermore, vegetables, brown breads, wheat cereals and baked beans were found to have the greatest amount of fibre per serve whereas once again treats and snack foods were nutrient-poor with the least amount of fibre per serve. The selection of cost effective healthy choices is imperative in populations such as this Pacific Island community.

Food insecurity is a major problem with Pacific Island families. Strategies for identifying healthy nutritious food, reducing pricing inequalities, consumer education and being able to offer alternative nutritious food choices need to be actively explored to help create small but significant changes financially and health-wise.

ACKNOWLEDGEMENTS

The Pacific Islands Families (PIF) Study is funded by grants awarded from the Foundation for Research, Science & Technology, the Health Research Council of New Zealand and the Maurice & Phyllis Paykel Trust. The authors gratefully acknowledge the families who participate in the study as well as other members of the research team. In addition we wish to express our thanks to the PIF Advisory Board for their guidance and support.

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紐西蘭奧克蘭的太平洋社區之糧食安全、選擇及健康飲食

當一個嬰兒進到一個家庭時，由於額外需求加諸父母，它通常為情緒的、經濟的及生理的壓力的一刻。家戶糧食安全係指“在任何時間都有足夠及營養均衡的食物可提供熱量及營養素，以維持一個活躍及健康的生活所需”。1376名太平洋島嶼（為太平洋島嶼家庭研究的一部份）其小孩出生約六週的母親，被問到有關於糧食安全的問題。39.8%家戶會因缺錢，導致有時糧食耗盡，3.8%為經常耗盡。39.3%其糧食的多樣性受限於金錢的缺乏。缺錢時仍然會購買的糧食包含：麵包(97%)、牛奶(95%)、肉類及雞肉(91%)、蔬菜及水果(83%)、米或是麵(82%)、早餐穀類(69%)、魚或是貝類(50%)及餅乾或是洋芋片(44%)。酒精(1%)、軟性飲料(11%)、冰淇淋(12%)及果汁(21%)為較少購買者。進一步分析因缺錢而受限的傳統食物的熱量密度(MJ/kg)及營養素密度。每一塊錢的米、麵包及油脂高的肉類所提供了大部分的熱量，蔬果則最少。每一塊錢的最佳蛋白質-價值來自於絞牛肉、雞肉及罐頭鮪魚以及大部分富含纖維的食物，包含白扁豆燒醃肉及混合蔬菜。糧食安全是太平洋家庭的重要問題。環境中的食物的可獲性、選擇及成本需要被注意，以協助縮短健康的差距。

關鍵字：糧食安全、肥胖、太平洋、熱量密度、飲食、成本。