Original Article

Home food availability is associated with multiple socio-economic indicators in 50 year olds from Canterbury, New Zealand

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Financial restraints and poverty lead to poor diets and poor health outcomes. Limited research shows that socio-economic status is related to home availability of certain foods. However, studies in this area have used different socio-economic indicators, which may not equally influence eating-related behaviors. Using multiple indicators of socio-economic status may provide a more accurate picture of these relationships. The aim of this study was to investigate whether several socio-economic indicators are independently associated with home availability of selected foods known to influence chronic disease risk in 50 year olds from Canterbury, New Zealand, participating in the CHALICE study. Participants were selected randomly from health research extracts from Canterbury. Data from 216 participants (110 females, 106 males) were included. The presence (but not quantity) of foods/beverages in the home was measured by a validated home food inventory. Linear regression analyses were performed for the following home food inventory scores: fruit, vegetables, lower fat dairy, obesogenic foods and sweetened beverages with household income, standard of living and education using multivariate models. Higher household income and standard of living were individually associated with a 2% to 3% higher fruit and vegetables (3 to 5 types/forms) and total food scores (6 to 9 types/forms) (p<0.03). Higher education level was associated with a 2.5% increase in fruit and vegetables score (4 types/forms) and an 8% decrease in sweetened beverages score (0.4 beverages) (p<0.02). These results suggest that using only one measure of socio-economic status cannot accurately capture the effects of social inequalities in food availability. Those experiencing the most social disadvantage had a lesser availability of fruit and vegetables which may be detrimental to good health.

Key Words: socio-economic status, New Zealand, food choice, home environment

INTRODUCTION

The inverse relationships between higher socio-economic status (SES) and morbidity and mortality rates from chronic diseases such as obesity, and cardiovascular disease (CVD) are well established worldwide[1] and in New Zealand.[2] It has long been established that diet plays an important role in the prevention of a number of chronic diseases. In particular, there is compelling evidence to show that diets rich in fruit and vegetables have health-protective effects from obesity, CVD and some cancers.[3-5] Research suggests that higher quality diets are associated with greater affluence, whereas energy-dense diets that are nutrient poor tend to be consumed by persons of lower SES.[6] Home food availability has been shown to predict dietary intake[7] particularly for fruit and vegetables,[8,9] dietary fat[10,11] and 'unhealthy' foods.[12] For example, child reported fruit and vegetable accessibility and availability were significant predictors for consumption accounting for about 10% of the variance in consumption;[8] and adult dietary fat intake was correlated with the number of high fat foods in the home.[11] However, most of the research in this area has focused on the effects of home food availability in children, and there is a scarcity of evidence from adult populations. Other factors as taste and food preferences,[13,14] food skills and self-efficacy and attitudinal factors may also influence household food consumption.[15] However, research has suggested that availability is the strongest single predictor of fruit and vegetable intake[13] and may actually moderate the association between preferences and consumption.[9]

Matching global trends, the price of food in New Zealand has been increasing. New Zealand Food Cost Survey results have shown that over the past eight years the cheapest weekly cost of purchasing a healthy, balanced diet in New Zealand has gone up by $15 and $13 per week to $65 and $61 for a man and woman, respective-

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ly.[16] While the price of food has increased, the average household income in New Zealand has remained relatively unchanged.[17] Income is a strong predictor of food insecurity, for example, a New Zealand study showed four-times the odds of being food insecure in the lowest income quartile compared with the highest.[18] Therefore, home food availability is likely to be related to SES due to the affordability of food and, in particular, the disparity in costs between 'healthy' and 'unhealthy' foods. As a result, health inequalities to some extent may be due to socio-economic differences in diet quality.[19] From the limited overseas literature available, which tends to focus on children and adolescents rather than adults, it appears that a higher SES is associated with a greater variety and availability of fruit and vegetables in the home,[20] and potentially a lesser availability of 'junk' foods such as potato chips and confectionary.[21]

The health and well-being of many people worldwide, particularly those of low SES, could be improved by increasing the consumption of fruits, vegetables and whole grains and reducing consumption of foods low in nutrients and high in added sugars, sodium, and fat, particularly saturated and trans-fats. Socio-economic status is influenced by many factors, and so it is suggested that researchers include a variety of different socio-economic measures specific to their population of interest,[22] rather than using only one measure, which is the case in much of the previous literature. In particular there is literature to suggest that using several socio-economic indicators is important when investigating associations between SES and dietary habits. For example, research has shown both education and occupation act as independent factors when assessing diet and SES.[23] The use of separate indicators for education, occupation and household income when assessing food purchasing behaviour showed different results and effect sizes depending on the measure used.[24]

Therefore, given the sparsity of research on how home food availability and socio-economic indicators, we examined associations between three socio-economic indicators; household income, standards of living and level of education and the availability of food and beverages in selected households with at least one person aged 50 years, from the Canterbury region of New Zealand. This research is important if community based interventions to positively influence dietary intake are to be developed.

MATERIALS AND METHODS

This study used data collected as part of the baseline assessment in the Canterbury Health and Lifecourse study, CHALICE study, a prospective longitudinal study including data collected from laboratory tests, interviews and self-completed questionnaires.[25] An up-to-date list of people (health research extract) who were currently 50 years old and registered in territorial authorities that align with the Canterbury District Health Board (CDHB) catchment area was obtained from the Electoral Roll Centre. From this health research extract information on 6,328 people not of Māori descent, and 413 people who identified as being of Māori descent was extracted. These two extracts were randomly ordered and participants were selected in a ratio of 4:1 non-Māori to Māori.[25] CHALICE methodology has also been described in detail elsewhere.[25] Ethical approval was obtained from the Upper South A Regional Ethics Committee. This manuscript uses baseline data collected for the first 300 CHALICE study participants, which were collected between 2010 and 2013.

For the purposes of this study, gender, ethnicity (self-selected), level of education, household income and standard of living were obtained from interviewer-administered questionnaires. BMI was calculated from height and weight measures collected by the study interviewer. Participants provided information on their highest level of education, which was classified into two categories - Low (secondary school education or less) and High (post-secondary school education). Gross total income of the household from all sources, in the last twelve months was categorised into Low (under $60,000), Medium ($60,001 to $100,000) or High (>$100,000). These cut points were based on national income data from the latest New Zealand Household Economic Survey.[17] The Household Economic Living Standard Index Short Form (ELSISF) was used as a direct measure for living standards[26] and has also been used in other similar New Zealand studies.[27] Participants were asked a series of questions including: home ownership, social participation, economising, self-rated standard of living, satisfaction with standard of living and adequacy of income.[26] ELSISF was categorised into Low ('hardship' to 'comfortable') and High ('good/very good').

The CHALICE home food inventory (HFI) is a checklist used to measure the availability of foods commonly consumed in New Zealand homes and is based on a validated HFI developed for use in the United States (US).[28] The CHALICE HFI contains a similar number of food items and categories and follows the same participant-friendly checklist format. Modifications were made to the original HFI to ensure that it suited the New Zealand context. These changes included addition of foods commonly consumed in New Zealand, such as Brussels sprouts and kumara and omission of foods not commonly consumed such as low fat crisps, and renaming relevant items eg, ice-lollies renamed to ice-blocks. These changes were made in consultation with a group of expert nutritionists. Furthermore, changes to the order and categories of food were made to improve ease of completion of the checklist, such as grouping canned foods together, and also to address any obvious 'bad food' versus 'good food' category perception. After these modifications were made the HFI was pre-tested in a convenience sample of eight men aged 50 or older. These participants were asked to fill in the HFI and attend a group interview to discuss the HFI. Feedback from this pre-testing was incorporated into the final HFI before use in CHALICE. The CHALICE HFI contains a comprehensive list of foods and beverages grouped into 13 food types, comprising 351 items in total. CHALICE HFI scores have been shown to be related to intakes of key nutrients of interest, as assessed by a four day estimated food record eg, vitamin C and saturated fatty acids.[7] Participants were asked to complete the inventory the first day after the main food shop for their household. Participants were asked to tick all items present anywhere in their home (open or unopened) and were asked to look in all possible food areas eg, cupboards,

deep freezers, vegetable gardens and not to complete the questionnaire from memory. The HFI also included a section to record the number of household occupants.

Foods/beverages were given a score of one if they were recorded as being present at home or zero if not. For the purpose of this study certain foods/beverages included in the HFI were classified into seven categories and included: fruit and vegetables together as one category and as two separate categories, a lower fat dairy category, obesogenic foods/beverages and sweetened beverages. The final category included was each participant's total food score. Foods/beverages could be included in two different categories if appropriate, for example, soft drink was classified as both obesogenic and as a sweetened beverage. In addition to dried fruit there were 25 different fruits included in the HFI which could be recorded as being fresh, canned/jars or frozen. There were 34 different vegetables which could be recorded as fresh, canned/jars, frozen and dried. Foods such as ready-made soups and coleslaw were also included in the vegetable category. Lower fat dairy foods/beverages included reduced fat versions of commonly eaten dairy products such as lower fat milk or reduced fat sour cream, and also products with a relatively low fat content such as a milk based frozen ice-block. In most cases the obesogenic scoring for the HFI was kept consistent with the original CHALICE HFI that is, giving an obesogenic score to foods that are high in fat and/or sugar, for example chocolate bars, potato chips and soft drinks and foods that are the regular fat version of which there are lower fat alternatives (eg, milk and cheese). Foods that were not in the original HFI were considered obesogenic if they were categorised as an occasional food in the Food and Beverage Classification system.

There were 54 foods/beverages included in the HFI that no participant had present at home. To calculate the maximum score, only foods that at least one participant had recorded as being present at home were included. Analyses were conducted using scores that included all foods, and then repeated using only the foods available in, at least one participant's home. As there were no differences in results between these two forms of scores, only the latter results are shown.

The HFI categories fruit and vegetables, lower fat dairy foods/beverages, obesogenic foods/beverages, sweetened beverages and total food were converted to percentage of total availability to allow for comparison of effect sizes between HFI scores of differing scales. Each linear regression model comprised one HFI score that was fitted individually against the relevant categories of each predictor variable (standard of living, level of education and household income). Each regression model also included the following covariates: sex, ethnicity, BMI and household size. Analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 20 (IBM, NY, USA), and all tests were 2 sided with type 1 error rate of 5%. Two way interactions were tested and omitted due to lack of significance and magnitude of effect. All models were tested for fit by graphical inspection.

RESULTS

Of the 690 people invited to take part in the study at the date of these analyses, 546 responded and 320 agreed to take part in CHALICE. 300 participants completed the baseline assessment and 216 of these (72%) (110 females and 106 males) returned a completed food HFI and had complete information available. Table 1 shows HFI scores for each category. After their main weekly shop participants had, on average, the following percentages of the listed foods available in the home: 21.5% for fruit and vegetables (35 types/forms), 28.9% for lower fat dairy (3 types/forms), 36.7% for obesogenic (23 types/forms) and 40.9% for sweetened beverages (2 beverages). Table 2 details participant characteristics, the population was well educated with 63% of participants having post-secondary school education; had a high income with 45% participants reporting a household income of at least $100,001; and had a high standard of living with 64% having a good to very good standard of living. The mean BMI was (27.8±6.0) kg/m^2 which is within the World Health Organisation (WHO) overweight range (BMI 25-29.9 kg/m^2). [29]

Household income and standard of living showed similar associations with HFI scores (Table 3). Having a higher household income and standard of living was associated with a 2.74% (CI: 0.35, 5.13%) (8.0 types/forms) and 2.88% (CI: 0.90, 4.85%) (8.5 types/forms) increased availability of total food in the home respectively. All three socio-economic indicators were associated with fruit and vegetable availability, with higher education most strongly associated with increasedavailability of fruit (β 2.68%, CI: 0.87, 4.49%) (1.7 types/forms) and standard of living most strongly associatedwith the availability of vegetables (β 3.27 %, CI: 1.40, 5.13 %) (3

Table 1. Food availability presented as the total score and a percentage of the maximum possible score[†]

Food Categories	Potential total score from the HFI	Maximum score (foods in ≥1 home)	Range of scores (%)	Mean score (%)
Total Food	351	297	29-161 (9.8-54.2)	90.5 (30.5)
Fruit & Vegetables	218	164	8-61 (4.9-37.2)	35.3 (21.5)
Fruit	76	62	2-23 (3.2-37.1)	11.7 (18.8)
Vegetables	142	102	6-43 (5.9-42.2)	23.6 (23.2)
Lower Fat Dairy	10	10	0-8 (0-80)	2.9 (28.9)
Obesogenic	63	63	1-47 (1.6-4.6)	23.1 (36.7)
Sweetened Beverages	5	5	0-5 (0-100)	2.1 (40.9)

[†]The potential total food score is the maximum score of foods the participant could have for each food category. The maximum score includes only foods/beverages that at least one participant had recorded as being present at home. Percentages were calculated by dividing each participant's food scores by the maximum score they could have had for the category.

Table 2. Participant characteristics

Characteristics	Category description	Category	Participants (n=216) (%)	Mean HFI score(SD)					
				Fruit & vegetables	Fruit	Vegetables	Lower fat dairy	Obesogenic	Sweetened beverages
Gender	Female		110 (51%)	35 (9)	12 (4)	23 (7)	3 (2)	23 (8)	2 (1)
	Male		106 (49%)	35 (10)	11 (4)	24 (7)	3 (2)	23 (9)	2 (1)
Ethnicity	Maori		33 (15%)	33 (11)	10 (4)	22 (7)	3 (2)	23 (8)	2 (1)
	Non-Maori		183 (85%)	36 (9)	12 (4)	24 (6)	3 (2)	23 (8)	2 (1)
Education	Secondary school or less	Low	80 (37%)	32 (10)	10 (4)	22 (7)	3 (2)	23 (9)	2 (1)
	Post-secondary school	High	136 (63%)	37 (9)	12 (4)	25 (6)	3 (2)	23 (8)	2 (1)
Household income/annum	≤$60,000	Low	58 (27%)	31 (10)	10 (4)	21 (6)	2 (2)	21 (9)	2 (1)
	$60,001-$100,000	Medium	60 (28%)	35 (9)	11 (4)	23 (6)	3 (2)	23 (6)	2 (1)
	≥$100,001	High	98 (45%)	38 (9)	13 (4)	26 (6)	3 (2)	25 (8)	2 (1)
Standard of living ($ELSI_{SF}$)	Severe Hardship – Comfortable	Low	77 (36%)	32 (9)	11 (4)	21 (6)	3 (2)	22 (9)	2 (1)
	Good -Very good	High	139 (64%)	37 (9)	12 (4)	25 (6)	3 (2)	24 (8)	2 (1)
BMI†	<18.50 kg/m^2	Underweight	1 (0.5%)	29	6	23	0	24	2
	18.50-24.99 kg/m^2	Normal Range	72 (33%)	35 (10)	12 (4)	23 (7)	3 (2)	22 (9)	2 (1)
	25.00-29.99 kg/m^2	Overweight Range	86 (40%)	36 (9)	12 (4)	24 (6)	3 (2)	24 (7)	2 (1)
	≥30.00 kg/m^2	Obese	57 (26%)	35 (9)	11 (4)	24 (7)	3 (1)	23 (8)	2 (1)
Household size	Mean (range)		3 (1%-8%)						
	1-2 people		77 (35%)	33 (11)	11 (5)	22 (7)	2 (1)	20 (8)	2 (1)
	3-5 people		131 (61%)	37 (9)	12 (4)	24 (6)	3 (2)	25 (8)	2 (1)
	6-8 people		8 (4%)	37 (8)	12 (4)	25 (5)	3 (1)	27 (3)	2 (1)

†WHO BMI categories for Caucasian adults.[29]

Table 3. Associations between food availability scores (percentage of the maximum potential category score) and predictor variables

	Household income (Low=1, High=3)[†]			Standard of living (Low=1, High=2)			Education (Low=1, High=2)			Household size		
	β[‡]	95% CI	*p*	β[‡]	95% CI	*p*	β[‡]	95% CI	*p*	β[‡]	95% CI	*p*
Total food (%)	2.74	0.35, 5.13	0.025	2.88	0.90, 4.85	0.004	1.43	-0.35, 3.22	NS	1.31	0.63, 1.98	<0.001
Fruit & vegetables (%)	2.48	0.46, 4.50	0.016	2.73	1.06, 4.39	0.001	2.52	1.01, 4.03	0.001	0.52	-0.05, 1.09	0.071
Fruit (%)	2.07	-0.36, 4.49	0.095	1.84	-0.17, 3.84	0.072	2.68	0.87, 4.49	0.004	0.76	0.08, 1.44	0.030
Vegetables (%)	2.73	0.47, 4.98	0.018	3.27	1.40, 5.13	0.001	2.42	0.73, 4.10	0.005	0.38	-0.25, -1.02	NS
Lower fat dairy (%)	4.59	-1.50, 10.7	0.140	2.82	-2.21, 7.85	NS	1.57	-2.98, 6.12	NS	2.15	0.43, 3.86	0.014
Obesogenic (%)	2.78	-1.89, 7.44	NS	3.14	-0.71, 7.00	NS	-0.55	-4.04, 2.94	NS	2.76	1.45, 4.08	<0.001
Sweetened beverages (%)	-0.56	-9.26, 8.14	NS	0.95	-6.23, 8.13	NS	-7.97	-14.5, -1.47	0.016	2.16	-0.29, -4.61	0.084

[†] There were no significant results when the medium to low income groups were compared so these results were not included.
[‡]β is the percentage difference in each score for each unit change in each predictor variable in each linear regression model. Each linear regression model comprised one HFI score that was fitted individually against all three SES indicators. All analyses were also adjusted for sex, ethnicity, BMI and household size.
Reference groups are the low groups for each of household income, standard of living and education. Household size is continuous.

types/forms). There were no significant associations found with any of the other food categories, with the exception of higher education being associated with having a lesser availability of sweetened beverages by 7.97% (CI: 1.47, 14.47%) (0.4 beverages). Having a greater number of people living in the household was associated with having a greater availability of all food categories. Female participants had a 4.84% (CI: 0.53, 9.14%) (0.5 types/forms) and an increased availability of lower fat dairy foods/beverages in their home than male participants but there were no gender differences for any of the other HFI scores. Ethnicity and BMI were not associated with any of the HFI scores (results not shown).

DISCUSSION

The results suggest that when investigating relationships between food and SES, it is important to include more than one measure of SES as the different SES indicators in this study showed different strengths of relationships with home food availability across HFI scores and not all SES measures were associated with all HFI scores. Also, while all three socio-economic indicators were associated with HFI scores for fruit and vegetables association strength also differed between SES indicators. Therefore, if only one SES measure is used there is the potential to not accurately capture the full extent of these relationships. Consistent with international research,[21,30] including the New Zealand Adult Nutrition Survey (NZANS),[31] investigating relationships between food choice and deprivation, the results from this study show that someone with high household income, high education and a higher standard of living would have a 7.7% (12.6 types/forms) greater variety of fruit and vegetables at home, compared with someone in the lower categories for these measures, regardless of ethnicity, BMI or gender. These results suggest that households with low income and low living standards may be forced to economise in order to afford the basics and have more restricted budgets for food. This may limit access to a wide range of fruit and vegetables which may in turn reduce their intake of these foods. Our study also showed that having a higher income and standard of living is associated with having a greater variety of total food available. This is not surprising as those with a higher SES should be able to afford to purchase a greater variety of food.

Having a higher level of education was also significantly associated with having a greater availability of fruit and vegetables and lesser availability of sweetened beverages, comparable with international and New Zealand research.[21,31,32] Previous work shows that those with a higher education may have a greater awareness of dietary recommendations, such as limiting consumption of sugary beverages,[33] and have greater nutritional knowledge, which may influence their food choices.[34,35] It is suggested that more educated people may be able to make better use of written material, to gain nutritional information and implement it in their lifestyles.[35] It has also been suggested that more educated people could be better able to understand the sometimes complex information about diet-disease links and, therefore, priorities fruit and vegetable consumption.[35] A diet high in fruit and vegetables can reduce the risk of chronic diseases such as CVD,[36] therefore, these results may help explain why health inequalities are seen between different SES groups in New Zealand, as research in the CHALICE cohort has also shown that restricted home food availability, particularly for fruit and vegetables is associated with less favourable dietary intakes.[7]

Gender was only associated with lower fat dairy product availability with female participants reporting greater availability of these foods at home (average of 3.2 foods/beverages) compared with males (average of 2.7 foods/beverages). This may be because women of this age group are often targeted for education about the importance of having adequate calcium intake, in order to prevent osteoporosis, through choosing foods such lower fat dairy foods/beverages.[37] Women may also purchase these low fat foods to facilitate weight loss or maintenance,[38] or as part of a healthier lifestyle. It is also possible that this finding may be due to female participants increased ability to identify low-fat dairy foods, compared with males, rather than an actual difference in availability.

The relationships seen may be primarily due to family financial constraints. Obesogenic foods high in added sugars and/or fats such as potato chips and biscuits are often a cheap option for consumers,[39] and these foods are perceived as an affordable way to provide calories.[39] However, our results showed that SES was not associated with the availability of obesogenic foods, which is inconsistent with previous research.[6,21] This may be a reflection of our small sample size in the low SES categories. Alternatively, as our results show that everyone has a similar variety of obesogenic foods in the home, but those with higher SES also have a higher variety of healthier foods, therefore, there is potential for a more balanced diet to be achieved by those of higher SES. Therefore, the proportion of healthy to unhealthy foods available within the home may be the most important factor influencing intake, but we are unable to assess this within the current study. The results may also be explained by the fact that some obesogenic foods such as takeaways are mostly consumed outside the home.

This research has several limitations. In these analyses we only adjusted for the total number of people in the household. We were unable to weight these responses by the age and gender of occupants. A girl aged 6 years is unlikely to consume as much food as a 16 year old boy, and it is possible that by allocating different weights by age and sex that results may change. We used information on the participants' level of education, which may not have reflected that of the entire household and research suggests that when it comes to family foods maternal education is more strongly related to this than paternal,[21] regardless of which parent has the highest level. We did not adjust for seasonality in these analyses. Availability of particular types of obesogenic foods in shops should not vary by season, which is not the case for fruit and vegetables. In New Zealand, prices of fruit and vegetables vary greatly by season, for example the price of fresh capsicum and tomatoes fluctuates considerably by 4-5 times. This means that those with financial constraints may choose different fresh fruit and vegetables over different seasons. However, this would not necessarily result

in seasonal effects on variety as they may rely on frozen forms of these foods instead.

The HFI did not incorporate foods purchased and eaten outside the home and the HFI only measures variety of types/forms of foods rather than quantity. Additionally the HFI does not allow assessment of proportions (in terms of quantity) of healthy versus unhealthy foods. Results may not be generalised to the entire New Zealand population as participants were of a specific age (50 years old) and living in one province in New Zealand. In addition the sample may not have been representative of the population with regard to level of education, household income and standard of living. One strength of the study is that the HFI was modified specifically for use in New Zealand. A self-reported HFI was used as this meant that researchers were not required to visit participants' homes, and would lead to increased participation rates, than for more invasive methods. Although there was potential for social desirability bias, research has shown a substantial agreement between self-reported and observed home inventories measuring fruit and vegetable availability.[40]

As all three socio-economic indicators were independently associated with the variety of different types of foods available within the home, using only one measure of SES cannot accurately capture the effects of social inequalities in food availability in the home. As research has shown home food availability to be associated with intake,[7] these results suggest that social disadvantage was associated with a lower availability of fruit and vegetables and this may be detrimental to good health.

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AUTHOR DISCLOSURES

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Original Article

Home food availability is associated with multiple socio-economic indicators in 50 year olds from Canterbury, New Zealand

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新西兰坎特伯雷 50 岁人群中家庭拥有食物与多项社会经济指标相关

财政制约和贫困导致不良的饮食与健康状况。为数不多的研究表明,社会经济地位与家庭是否能够拥有某些食物有关。然而，在这一领域的研究使用了不同的社会经济指标，这些不同的经济指标对摄食相关行为的影响不同。使用社会经济地位的多重指标可能更准确的描述这些关系。本研究的目的是调查新西兰坎特伯雷地区参与 CHALICE 研究的 50 岁人群，了解一些社会经济指标是否与家庭所有的已知具有引起慢性疾病的食物独立相关。参与者从坎特伯雷健康调查志愿者中随机抽取，共 216 名参与者（110 名女性，106 名男性），家庭现有的食物/饮料（非数量）以验证的家庭库存食物测量。对以下家庭食物评分并进行线性回归分析：水果、蔬菜、低脂食品、致肥食物和甜饮料等，并使用多元变量模型分析其与家庭收入、生活水平和教育的关系。较高的家庭收入和生活水平与更高的 2%-3%水果和蔬菜(3-5 种类/形式)和总食物得分(6-9 种类/形式)独立相关(p<0.03)。较高的教育水平与水果和蔬菜的评分(4 种类/形式) 增加 2.5%、与甜饮料评分(0.4 种饮料)下降 8%相关(p<0.02)。这些结果表明,只用一个社会经济地位测量方式不能准确地反应社会不平等带来的食物可用性的影响。那些经历蔬菜与水果可用性较少的群体可能不利于身体健康。

关键词：社会经济地位、新西兰、食物选择、家庭环境