

Eating and activity: the importance of family and environment

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Introduction

Obesity is one of the most significant health issues in New Zealand today, with women, Maori and Pacific people at elevated risk.¹ Adolescence is a time of particular vulnerability as eating habits may deteriorate during this period.²

Studies have shown that inadequate consumption of fruit and vegetables is prevalent, which may mean important nutrients are missed.³⁻⁵ Also, many school environments allow access to unhealthy food items.^{6,7} In New Zealand, Maori and Pacific students may be particularly vulnerable to eating these foods due in part to the greater likelihood of them buying their own food.⁷ Furthermore, breakfast may be neglected, which has implications for school performance, nutrient intake, and adult obesity.^{3,8} Girls appear particularly prone to skipping breakfast, possibly as a weight management strategy.^{9,10} The New Zealand

2001 Youth Health Survey (NZYHS) of secondary school students found that twice as many girls (63%) as boys reported trying to lose weight in the last year.¹¹

Along with a good diet, exercise is critical to good health.¹² Low levels of physical activity have been associated with obesity in youth and evidence is increasing that exercise programs are a promising way to treat obesity in this age group and may help protect against risk behaviours such as substance abuse.¹³⁻¹⁶ However, research in Western countries has shown that young people may become increasingly sedentary throughout adolescence, a finding that is particularly strong for girls.¹⁷⁻¹⁹ According to the NZYHS, boys were more likely than girls to have done moderate or strenuous exercise at least three times in the last week (males 70.4%, females 57.3%).¹¹

One thing young people are doing a lot of is watching television.

Abstract

Issue addressed: The aim of this paper was to examine the eating behaviours, physical exercise and television viewing of secondary school students, and to investigate their relationship with parental monitoring and family cohesion.

Method: The study was conducted at a secondary school in Auckland, New Zealand, in 2005. Questionnaires were administered to 433 students aged 13-16 years, spanning Years 9, 10 and 11. Descriptive statistics, ANOVA and correlational analyses were used.

Results: Overall, boys and younger students reported eating more 'unhealthy' foods. Frequency of buying own food (which 59.5% did at least twice a week) was strongly correlated with eating 'unhealthy food' ($r=0.50$). Parental monitoring (PM) and family cohesion (FC) were significantly positively related to participants' reports of eating breakfast and eating healthy foods, and significantly negatively related to reports of buying own food and eating unhealthy foods. Most (65.5%) reported exercising at least three times a week, boys more than girls. Exercise rates were moderately correlated with eating healthy food and weakly related to PM and FC. Television viewing was related to eating unhealthy food.

Conclusions: Adolescents who buy their own food make many 'unhealthy' food choices. Healthy eating and, to a lesser extent, exercise and reduced television viewing are related to increased levels of parental monitoring and family cohesion.

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So what?

Strategies are needed to address the food choices available to young people. Interventions that focus on parental involvement may positively influence health behaviours.

Previous research has shown a complex interaction between time spent watching television, physical activity levels and body fat levels.²⁰⁻²³ A recent New Zealand study found that at 15 years, the more television watched the less the young person participated in physical activity, which in turn predicted adult cardio-respiratory fitness, overweight and smoking.²⁴ However, other studies have suggested watching television does not displace physical activity but rather takes the place of other sedentary activities.²¹⁻²³ Even if television does not reduce exercise time, it still may be problematic by increasing snacking and exposure to advertisements promoting processed food.²⁵

Adolescence is a period in which young people are increasingly independent of direct parental control. Nevertheless, some level of parental monitoring is highly desirable and has been found protective for substance abuse and risky sexual behaviour.²⁶⁻²⁸ Family cohesion (i.e. emotional bonding between family members) is important in facilitating positive supervision, and parental connectedness to their adolescent child has been found to protect against cigarette, alcohol and marijuana use, suicidality and sexual activity.²⁹⁻³¹ While two recent studies found little or no effect for perceived parental control over fruit and vegetable intake,^{32,33} eating dinner as a family has been connected to positive nutrition.³⁴

The current study sought to measure the eating, exercise and television habits of a sample of New Zealand secondary school students. One key aim was to see if these were related to school year and gender in order to examine when positive or negative shifts are occurring. The second key aim was to measure if and how parental monitoring and family cohesion are related to these key health behaviours, given the paucity of previous research on this.

Method

Participants

Participants were 433 students from an ethnically diverse co-ed secondary school in a low/middle income area of Auckland, New Zealand. All Year 9, 10 and 11 students present at school during the day of the survey and whose parents had given written consent were invited to participate. Overall, 74% of the students in these years took part. The main contributor to non-participation was lack of signed parental permission.

The participants were 13-16 years old (mean age 14.25, SD 0.91) with 233 girls and 200 boys. There were 157 from Year 9, 153 from Year 10, and 123 from Year 11. Altogether, 59.5% were Pakeha (New Zealand European) or other European, Asian 21.7%, Maori 15.7%, Pacific 17.8%, and other ethnic group (e.g. African, South American or Middle East) 10.6%.

Measures

The questionnaires gathered information on participants' current

year in school, age, gender and ethnicity. Three items were used to assess eating behaviours. Participants were asked to indicate how often in the last month they had eaten breakfast. Response options were 'never', 'once or twice a week', '3-4 times a week', '5-6 times a week', and 'every day'. They were also asked how often in the last month they had bought food for themselves (including lollies and drink), and consumed the following 13 items: fruit or fruit juice, salads/raw or cooked vegetables, milk, cheese, yoghurt, meat/fish/chicken, soft drinks, chocolate bars, cakes and pastries, hamburgers/hot chips/KFC/hot dogs, lollies, pies, and potato chips/Nachos/Twisties. These food items were adapted to New Zealand from a study based upon the United States Department of Health and Human Services Year 2000 Nutrition Health Status and Risk Reduction Objectives.³⁵

Response options for these two items were 'never', 'once a week or less', '2-5 times a week', '6-7 times a week', and 'every day'.

Three items assessed physical activity and two items assessed the frequency of television viewing. Participants were asked "How often in the last month you have done any exercise or activity that makes you sweat, or breathe hard, or gets your heart rate up (such as rugby, running, swimming laps, fast bicycling etc.)?" Response options were 'never', 'once or twice a week', '3-5 times a week', '6-7 times a week' and 'more than once a day'. Participants were then asked to state the type and length of time of the exercise or activity. They were also asked how many hours were usually spent watching television (or videos or DVDs) on weekdays and weekends.

Silverberg's six-item Parental Monitoring Scale assessed participants' perceptions of parental monitoring (communication and supervision). Items asked participants whether parents keep track of his or her whereabouts, what he or she is doing, and whom he or she spends their time with. For example, "I tell my parent(s) who I am going to be with before I go out." Response options were 'never', 'rarely', 'sometimes', 'most of the time' and 'always'. Responses were averaged across the six items to obtain a parental monitoring score. Factor analysis of the items in previous research revealed a single-factor structure and high internal consistency as measured by Cronbach's alpha, ranging from 0.87 to 0.92.²⁸ In the current study an alpha of 0.83 was obtained, revealing a high degree of reliability.

The six-item family cohesion scale assessed the degree to which participants perceived members of their family to be separated from or connected to each other. The scale was adapted from the family cohesion component of the Family Adaptability and Cohesion Evaluation Scales (FACES II). In order to keep the questionnaire as short as possible, six items were selected that covered the key components of the scale (emotional bonding, time, space, friends and decision making) and that appeared

most relevant to New Zealand family life. For example: "Family members are supportive of each other during difficult times". Response options were 'never', 'rarely', 'sometimes', 'most of the time' and 'always'. Responses were averaged across the six items to obtain a family cohesion score. The alpha in the current study was 0.86, indicating high reliability despite reducing the number of items.

The questionnaire also contained items measuring self-efficacy as well as risk and protective health behaviours. As the results of these questions were not analysed for the current study, details are not reported here.

Results

Breakfast. In total, 8.5% reported never eating breakfast, 18.5% once or twice a week, 12.7% 3-4 days a week, 15.7% 5-6 days a week, and 44.6% every day. Analysis of variance revealed no year-level effects, but there was a significant gender effect ($F(1, 433)=18.945, p<0.01$). Boys (mean 4.01, SD 1.30) reported eating breakfast more often than girls (mean 3.42, SD 1.45).

Buying own food. Only 6.7% reported never buying their own food, 33.8% once a week or less, 36.8% 2-5 times a week, 14.6% 6-7 times a week, and 8.1% more than once a day. ANOVA revealed no year-level or gender effects.

Food intake. Table 1 shows the frequencies of consumption of the 13 food items measured. Meat/fish/chicken, milk, fruit or fruit juice and salads and vegetables were reported most frequently consumed. MANOVA revealed a significant gender

Table 1: Participants' reported frequency of eating the food items (n=433).

Food item %	Never	Once a week or less	2-5 times a week	6-7 times a week	More than once a day
Fruit or fruit juice	4.9	13.9	37.0	24.1	20.1
Soft drinks	6.3	38.2	30.1	15.7	9.7
Chocolate bars	8.8	42.6	31.7	10.0	6.9
Cakes or pastries	15.5	46.1	27.1	8.6	2.8
Salads, raw or cooked vegetables	6.5	13.0	26.2	41.4	13.0
Hamburgers, hot chips, KFC, hot dogs	11.1	51.4	25.5	7.4	4.6
Milk	9.5	11.8	20.9	28.5	29.2
Cheese	13.4	32.3	30.9	16.9	6.5
Yoghurt	31.2	27.0	23.3	12.7	5.8
Lollies	9.5	37.0	27.8	16.0	9.7
Meat/fish/chicken	1.9	3.9	20.6	50.7	22.9
Pies	28.7	41.7	17.1	8.8	3.7
Potato chips/Nachos/ Twisties	7.6	27.8	37.0	16.0	11.6

effect for the consumption of salads and raw or cooked vegetables ($F(1, 422)=7.469, p<0.01$), milk ($F(1, 422)=20.857, p\leq 0.001$) and pies ($F(1, 422)=19.224, p\leq 0.001$). As shown on Table 2, girls reported eating salads and vegetables more often than boys, and boys reported drinking milk and eating pies more often than girls.

There was also a significant year effect for eating cakes or pastries ($F(2, 422)=3.515, p<0.05$), pies ($F(2, 422)=7.317, p<0.01$) and yoghurt ($F(2, 422)=5.764, p<0.01$), with Post hoc Tukey's HSD test showing that the Year 9 students reported eating cakes and pastries more often than Year 10 students ($p<0.05$), and yoghurt more often than Year 11 students ($p<0.01$). Also, Year 9s reported eating pies more often than both Year 10 and Year 11 students ($p<0.01$). Table 2 contains means and standard deviations for these items.

A variable 'unhealthy food' was created by averaging responses to how often participants had eaten 'unhealthy' food items (foods probably high in fat and/or salt and/or sugar, recommended for only occasional consumption by the Ministry of Health food and nutrition guidelines), i.e. chocolate bars, cakes and pastries, hamburgers/hot chips/KFC/hot dogs, lollies (candy/sweets), pies, potato chips/Nachos/Twisties, etc, and soft drinks. A variable 'healthy food' was created by averaging responses to how often participants had eaten healthy food items (foods that provide protection from ill health, recommended for daily consumption by the Ministry of Health), i.e. fruit or fruit juice, salads/raw or cooked vegetables, milk, cheese, yoghurt, meat/fish/chicken.³⁶

MANOVA revealed no gender effects, but there was a significant year-level effect for frequency of consuming unhealthy food items ($F(1, 422)=3.788, p<0.05$) with Post hoc Tukey's test showing that the Year 9 students (mean 19.20, SD 6.04) reported eating unhealthy foods more frequently than Year 10 (mean 17.59, SD 4.75).

Physical activity. In total, 10.2% of male and female participants reported never exercising, 24.3% once or twice a week, 35.9% 3-5 times a week, 16.2% 6-7 times a week and 13.4% more

Table 2: Food items with gender and school year differences.

	Gender		Year in school		
	Male n=195	Female n=227	9 n=153	10 n=150	11 n=119
Salads and raw or cooked vegetables	3.25 (1.11)	3.55 (1.03)	NS	NS	NS
Milk	3.88 (1.10)	3.32 (1.37)	NS	NS	NS
Pies	2.40 (1.07)	1.97 (1.00)	2.43 (1.11)	2.05 (1.00)	1.99 (1.00)
Yoghurt	NS	NS	2.56 (1.37)	2.35 (1.19)	2.08 (0.95)
Cakes and pastries	NS	NS	2.53 (1.05)	2.27 (0.92)	2.26 (0.79)

than once a day. MANOVA revealed no year differences, however there was a significant gender effect ($F(1, 432) = 13.876, p \leq 0.001$). Boys (mean 3.21, SD 1.21) reported exercising more often than girls (mean 2.79, SD 1.09).

Responses to the open-ended question concerning the type of physical activity undertaken were coded into the following categories: a) structured activities, such as rugby, netball, or dance class; b) independent activities, such as swimming, running, or lifting weights; c) walking, which included walking the dog and walking to and from school. Many participants reported taking part in structured (52.1%) and independent (47.4%) activities, while fewer reported walking (12.1%). Chi-square analysis revealed no year differences, but there was a gender effect for walking as a type of exercise $\chi^2(1, n=430) = 12.562, p < 0.01$ with more girls (76.9%) reporting walking as a type of exercise than boys (23.1%).

Television viewing. Open-ended responses to the questions concerning the number of hours spent watching television on weekdays were categorised as follows: a) never or less than one hour; b) 1-4 hours; c) four hours or more. Because of the extra hours students had available to watch TV on weekend days for this item, variable c) was changed to 4-8 hours and a variable d) was created for eight hours or more.

In total, 4.4% reported never spending time watching TV on most weekdays, 48.2% between 1-4 hours, and 47.3% four hours or more. Concerning the weekend days, 1.9% reported never spending time watching TV, 39.3% 1-4 hours, 40.9% 4-7 hours and 18% eight hours or more. MANOVA revealed no year or gender effects.

Correlations between family, food, TV and exercise variables.

Table 1 shows the relationships between these variables. The strongest correlations were between parental monitoring and family cohesion ($r=0.52$) and buying own food and eating 'unhealthy food' ($r=0.50$). There were also notable positive correlations between family cohesion and eating healthy foods

($r=0.25$), parental monitoring and eating breakfast ($r=0.28$), eating breakfast and eating healthy foods ($r=0.25$), physical exercise and eating healthy foods ($r=0.25$), weekend TV viewing and eating unhealthy food ($r=0.23$) and notable negative correlations between parental monitoring and buying own food ($r=-0.25$), and parental monitoring and eating unhealthy foods ($r=-0.29$).

Discussion

This study highlighted areas of concern in a significant number of the participants' eating habits, particularly skipping breakfast, low fruit and vegetable intake, and eating food high in fat and/or sugar.

Slightly under half of students reported eating breakfast every day, and girls were less inclined to do so than boys. This echoes an Australian study that found a similar gender difference.⁹ Given the importance of breakfast from both an educational and health perspective, these rates are of some concern.⁸ However, it must be noted that adolescents have been found to under-report food intake in many studies and so these results must be interpreted cautiously.³⁷ Boys reported eating more pies and girls more vegetables as was found in previous research.¹⁰ Girls reported drinking milk less frequently than boys, which may be problematic as girls have been found to have inadequate intakes of calcium in other studies.^{4,38} These gender differences are consistent with girls potentially being more concerned about weight, which has been found previously to lead to some healthier food choices but also to an exclusion of important nutrient-dense foods.³⁹

Students in Year 9 reported eating more 'unhealthy' food items than older students. It is likely that as students mature there are changing influences on their food choices. Younger adolescents may associate eating 'junk' foods with increasing independence and feel more pressure to conform to their peers. However, a stronger sense of personal identity and more abstract reasoning

Table 3: Correlations between family, food, TV and exercise variables (n=433).

	1	2	3	4	5	6	7	8
1 Parental monitoring								
2 Family cohesion	0.52 ^b							
3 Buying own food	-0.25 ^b	-0.9 ^b						
4 Unhealthy foods	-0.29 ^b	-0.18 ^b	0.50 ^b					
5 Healthy foods	0.19 ^b	0.25 ^b	0.04	0.11 ^a				
6 Eating breakfast	0.28 ^b	0.14 ^b	-0.16 ^b	-0.18 ^b	0.25 ^b			
7 Physical exercise	0.11 ^a	0.12 ^a	0.10 ^a	-0.01	0.25 ^b	0.09		
8 TV viewing week days	-0.15 ^b	-0.05	0.13 ^b	0.20 ^b	-0.10 ^a	-0.04	-0.06	
9 TV viewing weekend	-0.12 ^b	-0.05	0.12 ^a	0.23 ^b	0.20 ^b	-0.02	-0.07	-0.07

(a) Significant differences at $p < 0.05$ (2-tailed).
(b) Significant differences at $p < 0.01$ (2-tailed).

skills in later adolescence may mean that with age adolescents are less affected by peers, and develop a greater understanding of the relationship between future health and current food choices.⁴⁰

It is of concern that 19% reported eating fruit or having fruit juice once a week or less and only 44% having this most days. Although somewhat more reported having vegetables most days (54%), 20% indicated having them once a week or less. This suggests many young people are way below New Zealand Ministry of Health recommendations of at least three servings of vegetables and two servings of fruit each day.

More than half bought their own food at least twice a week, with nearly one in four buying their own food at least once on most days. It is of considerable note that buying food was strongly correlated with eating 'unhealthy' food, such as lollies, chocolate and hamburgers/hot chips/KFC/hot dogs. Although we did not measure where the participants bought food, it is likely that at least some was from school. Several studies have suggested that with improvements in the food for sale at school, students are likely to eat better.^{6,41,42}

In addition, both buying own food and eating unhealthy food were negatively related to parental monitoring and family cohesion. On the other hand, these family variables were positively related to eating healthy food. This suggests the importance of parents and a supportive family atmosphere, despite previous research finding that parental control did not highly correlate with adolescent fruit and vegetable intake.^{32,33}

Nearly 90% reported being involved in physical activity at least once or twice a week. Although boys reported higher levels of vigorous physical activity than girls, it was very encouraging that there was no decrease in the rates of activities with age, as may have been expected from previous research.^{18,19,43,44} It was also good to see that girls and boys were equally likely to be involved in structured physical activities, as participation in competitive or team sports is the best (although weak) predictor of involvement in physical activity in later life.⁴³⁻⁴⁵ Sports and other structured activities may also increase social networks and reduce the time available for less positive endeavours.⁴⁶ Schools can certainly be a suitable context for programs to increase physical activity, although they may not reach those who are disengaged.^{47,48}

Participants reported watching a lot of television, with 46% watching four or more hours of television on weekdays. These findings are consistent with previous research showing that young people watch a lot of television.²⁴ Our study also found that television watching was related to greater consumption of unhealthy foods. Part of this may be due to the commercials they are exposed to, as one study found more than half of the commercials on New Zealand's children's television were for food high in fat and/or sugar.⁴⁹ It must be noted, however, that

a recent review suggests the impact of such advertising is hard to determine and may be minimal.⁵⁰ We did not find that television viewing was negatively related to levels of physical activity, supporting research suggesting it only displaces other passive activities.^{20,21} Parental monitoring was positively related to exercise frequency and negatively to television viewing, indicating as with eating habits that a supportive family is health-promoting for youth.

This study was limited by relying on self-report, which is subject to a variety of biases.³⁷ It was also conducted at a single school and a significant minority of potential participants were excluded as they did not have written parental consent. It is unknown in what ways this group may have been different from those whose parents did return consent forms. It is certainly possible that non-returning parents may, on average, have been less monitoring of their child's behaviour, which the current findings suggest may also mean the study has somewhat under-estimated those with poor eating habits, reduced physical exercise and high television viewing.

Implications for research and practice

It seems clear that families are very important throughout the secondary school years in setting the context for young people to eat well, exercise, and find alternatives to television. It also appears that young people are likely to choose high fat and sugar foods far more than is desirable when they have money to buy their own food. This indicates a dual approach is required. Healthier choices need to be made available in school canteens as given our findings it can be assumed young people are more likely to purchase meals that are high in fat and sugar if they are provided as an option. It would also be helpful to give parents clear guidelines as to their role in improving their adolescent child's health. While this could take many forms, providing at least a piece of fruit to take to school each day is a clear and manageable target that could readily be the focus of a health promotion campaign aimed at families. On a more positive note, this study showed good levels of exercise among participants, suggesting the value of schools and communities continuing to provide a wide variety of opportunities for young people to be active.

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