

Is the perception of time pressure a barrier to healthy eating and physical activity among women?

Nicky Welch*, Sarah A McNaughton, Wendy Hunter, Clare Hume and David Crawford

Centre for Physical Activity and Nutrition Research, Deakin University, 221 Burwood Highway, Burwood 3125, Australia

Submitted 20 December 2007: Accepted 3 April 2008: First published online 23 July 2008

Abstract

Objectives: To describe the proportion of women reporting time is a barrier to healthy eating and physical activity, the characteristics of these women and the perceived causes of time pressure, and to examine associations between perceptions of time as a barrier and consumption of fruit, vegetables and fast food, and physical activity.

Design: A cross-sectional survey of food intake, physical activity and perceived causes of time pressure.

Setting: A randomly selected community sample.

Subjects: A sample of 1580 women self-reported their food intake and their perceptions of the causes of time pressure in relation to healthy eating. An additional 1521 women self-reported their leisure-time physical activity and their perceptions of the causes of time pressure in relation to physical activity.

Results: Time pressure was reported as a barrier to healthy eating by 41% of the women and as a barrier to physical activity by 73%. Those who reported time pressure as a barrier to healthy eating were significantly less likely to meet fruit, vegetable and physical activity recommendations, and more likely to eat fast food more frequently.

Conclusions: Women reporting time pressure as a barrier to healthy eating and physical activity are less likely to meet recommendations than are women who do not see time pressure as a barrier. Further research is required to understand the perception of time pressure issues among women and devise strategies to improve women's food and physical activity behaviours.

Keywords
Time pressure
Women's health
Dietary intake
Fruit
Vegetables
Physical activity

Inadequate nutrition and physical inactivity are key determinants of a range of chronic diseases including obesity, type 2 diabetes, CVD and certain types of cancers⁽¹⁾. However, low consumption of fruits and vegetables, high consumption of energy-dense fast food and inadequate levels of physical activity are common in the population^(2–4). Women typically participate in less leisure-time physical activity (LTPA) than men⁽²⁾, and despite increased participation in the workforce in recent years, women generally remain responsible for the sourcing, preparation and cooking of meals in most households⁽⁵⁾. Given that women are at high risk of weight gain⁽⁶⁾, an understanding of the determinants of healthy eating and physical activity among this group is crucial.

There is a wide range of determinants of healthy eating and physical activity, and one commonly cited barrier to these behaviours is time pressure^(7,8). This is often reported among women, with recent qualitative evidence

suggesting Australian women's perception of time pressure was a fundamental barrier to their healthy eating and physical activity⁽⁹⁾. The concept of time constraint in relation to food is complex. It may reflect an individual's perception of time available for food shopping and preparation, but likewise may be associated with their perception of the time demands of the people for whom they are providing food, for example, their family⁽¹⁰⁾. However, although widely reported as a barrier to healthy eating and physical activity, little is known about the reported causes of time pressure. One hypothesis about the potential causes of time pressure relates to employment. A shortage of time for healthy eating has been linked to increasing numbers of parents in the workforce and longer hours or increased pressure in the workplace⁽¹¹⁾. It has been suggested that it may be increasingly hard to prioritise good nutrition in the context of contemporary lifestyles and social trends that include longer

*Corresponding author: Email nicky.welch@deakin.edu.au

working hours, longer distances to travel between work and home and increased time spent outside the home⁽¹¹⁾. All of these issues may impact the perception of a lack of time to prepare healthy and nutritious meals⁽¹²⁾.

Time constraints are also reported as a barrier to physical activity, for both active and sedentary people^(13,14). British research found that almost 40% of women reported that a lack of time prevented them from exercising more often⁽¹⁵⁾. Work status has also been shown to be associated with physical activity. One study among a large sample of Australian women found that women who worked more than 14 h per week were less likely to meet physical activity guidelines than those who spend fewer hours in the paid workforce⁽¹⁶⁾.

Time pressure may also be related to family commitments. One recent study found that those who reported the greatest feelings of time scarcity were single mothers⁽¹⁷⁾. Further, Ziolo-Guest *et al.*⁽¹⁸⁾ found that single parents spent a greater share of their food budget on time-saving foods (e.g. takeaway food), compared to married parents, although this association was strongest among single fathers buying convenience and fast foods. Additionally, O'Dougherty *et al.*⁽¹⁹⁾ found an increasing use of fast, convenience food because of perceived time constraints among predominantly low-income African-American and Latino families. Family factors are also likely to be related to physical activity. Changes in family status (e.g. becoming a mother) have been linked to decreases in physical activity and caring for children may be a barrier to maintaining physical activity⁽²⁰⁾. Indeed, previous research among Australian women suggests that women with children perceived physical activity as less feasible than did women without children⁽²¹⁾.

There are few studies that have empirically investigated other potential causes of time pressure, and whether time pressure is related to both healthy eating and physical activity, particularly among women. The aims of the present paper are to describe the proportion and characteristics of women who report that time is a barrier to healthy eating and physical activity, the perceived causes of time pressure, and to examine associations between perceptions of time as a barrier, and intake of fruits, vegetables and fast food, and LTPA.

Methods

The present cross-sectional study used a stratified random sampling procedure to recruit participants from forty-five neighbourhoods within approximately 25 km of Melbourne's* central business district. During 2003, a random sample of women on the electoral roll† aged

between 18 and 70 years drawn from each of the forty-five neighbourhoods received a questionnaire examining healthy eating. We expected disparities in response rates from groups of lower socio-economic position and therefore over-sampled low- and mid-socio-economic status (SES) neighbourhoods relative to high-SES neighbourhoods. A total of 1136 women responded (a 50% response rate excluding ineligible women). A survey on physical activity that included a small number of diet items was also posted to a different sample of 2400 women, randomly selected from the same neighbourhoods and similarly over-sampling low- and mid-SES neighbourhoods. Respondents to this survey were asked whether they were also willing to complete the diet survey, and this resulted in an additional 444 respondents. Full details of the study methods are provided elsewhere^(22,23). A \$1 lottery ticket was included with the initial survey package as compensation for their time, and women were entered into a competition to receive one of five shopping vouchers or movie passes. Approval to conduct the research was obtained from the Deakin University Human Research Ethics Committee.

Measures

Sociodemographic details

Participants provided information on age, marital status, presence of children at home, educational qualifications and occupational status. Women were asked to self-report their highest level of education level as either 'Less than year 12' (low); 'Year 12', 'Trade or certificate' (medium); 'Degree or higher degree' (high). Age was categorised into 'Under 30', '30–39', '40–49' and '50+' years. Marital status categories included 'Living in a registered marriage/*de facto* relationship', 'Separated/divorced or widowed' or 'Never married'. Working status was determined from self-reports of paid employment, both part- and full-time, and the questionnaire also sought details of the presence of children at home.

Perceived causes of time pressure

Based on the findings of prior qualitative research⁽⁹⁾, ten items were included that asked women about the various causes of perceived time pressure (e.g. If lack of time is a barrier to healthy eating for you, is the main cause of this 'Long hours at work/study', 'Inflexible hours at work/study', 'Unpredictable hours at work/study', 'Working unusual hours', 'Family commitments to children', 'Family commitments to other family members', 'Commitments to friends/relatives' or 'Volunteer and community work'). The details of the items are included in Table 2. Responses were dichotomised into a variable that indicated whether or not time pressure was a barrier to healthy eating and/or physical activity.

* An Australian city of four million people.

† Voting is compulsory in Australia. This method of sampling may result in the under-representation of those people who live permanently in Australia but are not citizens, but will adequately represent all adult women who are citizens of Australia.

Intakes of fruit, vegetables and fast food

Women's intake of fruit and vegetables were assessed using questions adapted from the Australian National Nutrition Survey (NNS)⁽²⁴⁾. These questions asked 'How many servings of [fruit/vegetables] do you usually eat each day?' (a serving of fruit was defined as one medium piece or two small pieces of fruit, or one cup of diced fruit; a serving of vegetables was defined as 1/2 cup of cooked vegetables or one cup of salad vegetables). The response categories were 'None', '1 serving', '2 servings', '3–4 servings' or '5 servings or more'. The test–retest reliability of these measures has been shown to be high (intra-class correlation (ICC) = 0.85 for fruit and ICC = 0.85 for vegetables)⁽²⁵⁾. These questions have been evaluated and shown to valid measures of food intake^(26,27). Based on national guidelines⁽²⁸⁾, women were then categorised as meeting fruit guidelines; that is, those who ate two or more servings per day, and those who ate less than two servings per day. According to national guidelines⁽²⁸⁾ adults should consume five or more servings of vegetables per day. However, as only 5% of the sample consumed vegetables at this level, participants with intakes of 3–5 servings per day were categorised as having high vegetable intakes and those consuming two 2 servings or less per day were classified as having low vegetable intakes.

Fast food consumption was assessed via two questions that asked: 'How many times per week, including breakfast, lunch and dinner, do you eat meals that are from fast food restaurants (e.g. pizza, McDonalds) eaten in the fast food restaurant?' and 'How many times per week do you eat meals that are from fast food restaurants eaten as "fast food" at home/work/study (including home delivery)?' The response categories were: 'Never'; 'Less than 1 meal/week'; 'About 1 meal/week'; '2–3 meals/week'; '4–5 meals/week'; '6–7 meals/week or more'. Total fast food consumption was calculated and women were then categorised as infrequent fast food consumers (one fast food meal per week or less) or frequent fast food consumers (more than one fast food meal per week) as these cut-off points have been shown to identify women at risk of weight gain⁽⁶⁾.

Physical activity

LTPA was assessed with the long version of the International Physical Activity Questionnaire⁽²⁹⁾. As per the protocol for this survey, minutes/week in leisure-time vigorous physical activity was doubled and total LTPA was calculated as the sum of moderate- and vigorous-intensity physical activity. Australian physical activity recommendations suggest adults participate in 150 min/week of at least moderate-intensity physical activity⁽³⁰⁾. Therefore, responses were dichotomised into 'those meeting physical activity guidelines' and 'those not meeting physical activity guidelines'.

Data analysis

Analyses were performed to describe the distributions of participants' age, education, marital status, the presence of children at home and working status. Cross-tabulations and the χ^2 statistic were used to examine associations between reporting time pressure as a barrier and women's socio-demographic characteristics. Logistic regression analyses were performed to examine the likelihood of meeting healthy eating and physical activity guidelines. Age, education, marital and working status and the presence of children at home were investigated as potential confounders and those that were associated with healthy eating and physical activity outcomes were adjusted for in the logistic regression analyses. Data were analysed using the Statistical Package for the Social Sciences statistical software package version 14 (SPSS Inc., Chicago, IL, USA) and a significance level of $P < 0.05$ was set.

Results

Characteristics of participants

The final sample comprised 1580 women in the healthy eating sample and 1521 in the physical activity sample. As shown in Table 1, the age range in both samples was similar, ranging from 18 to 70 years. Approximately 80% of both the healthy eating and physical activity samples had a medium or high level of education. Approximately half of the healthy eating and physical activity samples had children living at home and two-thirds were married. Based on 2005 Labour Force Survey data, 46% of Australian children aged up to 12 years were in some type of child care, it is possible that the women in the present study had access to child care⁽³¹⁾. Women engaged in

Table 1 Proportion of participations according to socio-demographic characteristics

	Healthy eating (n 1580) (%)	Physical activity (n 1521) (%)
Age (years)		
Under 30	20	21
30–39	26	25
40–49	25	24
50+	29	31
Level of education		
Low	23	22
Medium	40	41
High	37	37
Children		
Living at home	53	54
No children at home	47	46
Marital status		
Married or <i>de facto</i>	64	64
Separated/widowed	12	13
Never married	21	22
Working status		
Working	62	63
Not working	38	37

paid work comprised about 60% of both samples, while 28% of the healthy eating and 37% of the physical activity sample were not currently in paid employment. This is comparable to the proportion of women in the Australian workforce generally⁽³²⁾.

Time pressure as a barrier

Overall, 41% of women reported that time pressure was a barrier to healthy eating, while 73% of women reported time pressure was a barrier to engaging in physical activity (Table 2). Among women in the healthy eating sample, those aged under 30 years were more likely to report time pressure as a barrier to healthy eating than women in all other age categories (Table 2). Time pressure as a barrier to healthy eating was also reported at a higher rate among women reporting higher levels of education, never married and working as opposed to those with lower levels of education, those who were married and those women who did not work. There was no significant difference in the proportion of women reporting time pressure as a barrier to healthy eating

between those who had children living at home and those who did not.

Within the physical activity sample, women most likely to report that time pressure was a barrier to physical activity were aged less than 39 years (Table 2). A larger proportion of women who were currently working reported time pressure as a barrier to physical activity compared to those who were not in paid employment (79% and 64% respectively). Women with high levels of education, never married and those who had no children at home were more likely to report that time pressure was a barrier to physical activity than other women.

Perceived causes of time pressure

The most commonly reported cause of time pressure for healthy eating and physical activity was long hours at work or study (see Table 3). A large proportion of women in the healthy eating and physical activity samples reported that inflexible hours at work or study and unpredictable hours at work were causes of time pressure. Working unusual hours, such as shift work or weekends, was reported as a

Table 2 Characteristics of women who report time pressure is a barrier to healthy eating and to physical activity

	Time as a barrier to healthy eating (n 650)		Time as a barrier to physical activity (n 1132)	
	%	P value*	%	P value
Total sample	41		73	
Age (years)		<0.001		<0.001
Under 30	54		83	
30–39	51		83	
40–49	39		74	
50+	25		59	
Level of education		<0.001		<0.001
Low	30		62	
Medium	42		73	
High	48		81	
Children		0.351		<0.001
Living at home	42		67	
No children	40		78	
Marital status		0.001		0.011
Married/ <i>de facto</i>	39		73	
Separated/widowed	36		67	
Never married	50		78	
Working status		<0.001		<0.001
Working	48		79	
Not working	30		64	

* χ^2 test for proportions.

Table 3 Perceived causes of time pressure

	Healthy eating* (%) (n 650)	Physical activity* (%) (n 1132)
Time pressure is a barrier	41	73
Long hours at work/study	66	59
Inflexible hours at work/study	38	37
Unpredictable hours at work/study	39	34
Working unusual hours at work/study (e.g. shift work, weekends)	36	30
Family commitments to children	38	43
Family commitments to other family	36	49
Commitments to friends/relatives	31	37
Volunteer and community work	11	12

*Does not add up to 100% as participants could select multiple responses.

cause of time pressure by more than a third of the healthy eating sample and a third of the physical activity sample. Commitments to children and other family members were also causes of time pressure for a large proportion of the sample, as were commitments to friends and relatives. Few women reported that commitments to volunteer or community work was a cause of time pressure.

Associations between time pressure and healthy eating and physical activity

The associations between perception of time pressure and healthy eating and physical activity are presented in Table 4. More than half of the women who reported time pressure was a barrier to healthy eating were meeting fruit guidelines, while a significantly larger proportion of women for whom time pressure was not a barrier to healthy eating met fruit guidelines ($P < 0.001$). Likewise, among women who met vegetable guidelines, around almost one-third reported time pressure to be a barrier, as opposed to the 40% of women who did not ($P < 0.001$). While low numbers of women overall reported frequent consumption of fast food, the proportion eating more fast food was significantly higher among those who reported time is a barrier ($P < 0.05$). With regard to meeting physical activity guidelines, those who failed to meet guidelines were significantly more likely to report time pressure was a barrier to physical activity than the women who did not ($P < 0.001$).

As shown in Table 5, women who reported time pressure was a barrier to healthy eating were 40% less

likely to meet fruit consumption guidelines, compared to those who did not report time was a barrier ($P \leq 0.0001$). This was also significant for vegetable consumption, with those women reporting time pressure was a barrier to healthy eating being 47% less likely to eat three or more servings of vegetables daily compared to other women ($P \leq 0.0001$). Women who reported time pressure as a barrier were less likely to be infrequent fast food consumers; however, after adjustment for confounders, this was no longer significant. In relation to physical activity, women who reported time pressure as a barrier were 35% less likely to meet recommendations than women for whom time pressure was not a barrier ($P \leq 0.0001$).

Discussion

The study aimed to describe the proportion of women for whom the pressure of time was a barrier to healthy eating and physical activity, the characteristics of these women, the perceived causes of time pressure, and associations between time as a barrier and healthy eating and LTPA. Approximately 40% of women in this study reported time pressure was a barrier to healthy eating, which was almost double the proportion reported elsewhere⁽⁸⁾, while over 70% of the women reported that time pressure was a barrier to physical activity. Other studies^(8,21) have shown that substantial proportions of the population, and in particular women, see the pressure of time, or time scarcity,

Table 4 Results of χ^2 tests examining differences in perceptions of time pressure according to healthy eating and physical activity guidelines

	Time pressure is a barrier (%)	Time pressure is not a barrier (%)	P value
Meeting fruit consumption guidelines (<i>n</i> 632)			<0.001
Yes	53	66	
No	47	34	
Meeting vegetable consumption guidelines (<i>n</i> 632)			<0.001
Yes	26	40	
No	74	60	
Fast food consumption (<i>n</i> 632)			0.030
Infrequent	87	91	
Frequent	13	9	
Meeting physical activity guidelines (<i>n</i> 1132)			0.001
Yes	45	55	
No	55	45	

Table 5 Odds ratio and 95% confidence interval for the likelihood of meeting healthy eating and physical activity guidelines among women

	<i>n</i>	Crude			Adjusted		
		OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
Meeting fruit guidelines	1565	0.57	0.47, 0.71	0.000	0.60*	0.48, 0.75	0.000
Meeting vegetable guidelines	1562	0.52	0.42, 0.65	0.000	0.53	0.42, 0.67	0.000
Infrequent fast food consumption	1331	0.68	0.48, 0.97	0.000	0.78†	0.53, 1.14	0.192
Meeting physical activity guidelines	1489	0.68	0.54, 0.86	0.000	0.65‡	0.51, 0.83	0.000

*Adjusted for age, education and marital status.

†Adjusted for age, marital status and working.

‡Adjusted for education and children.

as a barrier to healthy eating and physical activity. The proportion of women who saw time pressure as a barrier to physical activity was much higher in the present study (73%) than in a British sample (40%), but similar to a sample of young Australian women (78%)⁽⁸⁾.

The present study advances previous research by examining a number of possible causes of time pressure. Women's perceptions of the causes of time pressure centred around long hours at either work or study. While some researchers have suggested that the length of working hours in Australia has changed little since the early 1990s⁽³³⁾, women in the present study still considered their working hours as a barrier to physical activity and healthy eating. Similar findings in relation to physical activity were found by Burton and Turrell⁽³⁴⁾. Another perceived cause of time pressure among women was their commitments to children and family, and the literature suggests that women will regularly put the needs of others, particularly children, before their own desires for exercise⁽²⁸⁾. In the present study, women's commitments to 'other family members', in particular, were cited by higher proportions of women in the physical activity sample than those in the healthy eating sample (however there was no significant difference between women who had children living at home compared to those who did not in the healthy eating sample). Additionally, in the physical activity sample, a larger proportion of women who did not have children at home, were not married or had high levels of education reported time as a barrier to physical activity compared to other women, although this may be related to long working hours. Further research is required to better understand the role of commitments to children and family, as well as employment, when considering women's own nutrition and physical activity.

The present study is unique in linking women's perception of time pressure to both food intake and physical activity. Those women who reported time pressure was a barrier were 40% less likely to meet fruit consumption guidelines, 47% less likely to eat three or more servings of vegetables and 35% less likely to meet physical activity guidelines compared to women who did not report time was a barrier. Given the recognised benefits for health and well-being linked to daily consumption of fruit and vegetables and regular physical activity, these findings suggest the need for a more detailed understanding of the phenomenon of time pressure and its role in nutrition and physical activity. Older women, in particular, were less likely to report time pressure as a barrier to healthy eating. There are a number of possible explanations for this including the possibility that these women had fewer demands on their time due to them having diminished employment or child care responsibilities. In addition, they may have had differing standards or expectations and thus may not have considered time pressure as an obstacle to nutrition and physical activity in particular.

This research raises a number of questions about time use. For example, are women who consider themselves too busy to prepare meals or undertake physical activity referring to demanding schedules (e.g. multiple jobs) or because they (unconsciously or otherwise) prioritise a variety of demands on their time above their own nutrition and physical activity? When time is measured objectively, it appears that people's perception of time is inconsistent; for example, while it may take a similar amount of time to drive to a fast food restaurant and order takeaway as it does to prepare a basic, healthful meal, it is often perceived differently, especially by those with limited cooking skills⁽³⁵⁾ or, indeed, limited energy. Some researchers argue that the difficulties of objectively measuring time use are an obstacle to understanding time pressure, and that to obtain meaningful results, direct measures and perceptions of time shortage of the research participants should be taken into consideration⁽³⁶⁾. The findings of the present study, however, suggest that regardless of whether time pressure is a perception or an objective reality, it appears to be associated with women's consumption of fruit and vegetables, fast food and their levels of physical activity.

It is plausible, of course, that the term 'time pressure' describes a much more complex phenomenon that includes the difficulties of balancing multiple roles. While long hours at work influence women's ability to meet alternative commitments, so too might the perceived pressures of employment. With the use of 'time deepening' techniques people can learn to do more than one thing at once⁽³⁷⁾, meaning that food choices may be based on factors that allow two things to be done at once, for example, being able to pick up takeaway food on the way home from work. Moreover, references to time pressure may be a socially sanctioned way of expressing alternative priorities. While some literature suggests that the more time that mothers spend in the family home, the more time they have to prepare nutritious meals⁽³⁸⁾, the present study adds a layer of complexity to this issue: while mothers who are not in the paid workforce may have more time, they may also have other priorities.

The findings of the present study are limited by the cross-sectional design that does not allow identification of causality. Additionally, it is possible that the range of factors of perceived time pressure was limited in scope. Additional data regarding specific contributors to time pressure such as shift work, job type and quality of child care were not available in the current study; therefore, future studies examining time pressure and women's health behaviours should consider incorporating such measures. The degree to which these findings are relevant to men is uncertain, although previously Popham and Mitchell found that men were less likely to perceive family involvement as a time pressure and barrier to exercise than women⁽³⁹⁾. The present study addressed perceptions of time pressure; therefore, objective measurements of time use, including

working hours, were not assessed. Further research is required that examines both subjective and objective measures of time use. None the less, the current study used a large sample of women from a range of socio-economic backgrounds and standardised dietary intake and physical activity assessment methods. As such, the study has important implications for the promotion of healthy eating and physical activity among women.

In conclusion, the findings raise the need for further research to better support women in their lifestyle choices and assist them in managing their diet and physical activity. Future research should further explore subjective perceptions of time pressure to better understand barriers to healthy eating and physical activity. Intervention studies testing practical strategies such as meal and time planning that are aimed at increasing women's confidence with managing time pressures are also required.

Acknowledgements

Source of funding: The present study was partly funded by the National Heart Foundation of Australia, (reference number G 02M 06). Nicky Welch and Wendy Hunter are supported by an NHMRC Capacity Building Grant. Sarah A McNaughton is supported by an NHMRC Public Health Postdoctoral Fellowship. David Crawford is supported by a Public Health Research Fellowship from the Victorian Health Promotion Foundation.

Conflict of interest: There are no conflicts of interest.

Authorship responsibilities: N.W. drafted the manuscript, and S.A.Mc.N., W.H., C.H. and D.C. contributed to the analysis, interpretation and writing. All authors read and approved the final manuscript.

References

- World Health Organisation (2003) *Diet, Nutrition, and the Prevention of Chronic Diseases. Report of a Joint WHO/FAO Expert Consultation*. Geneva: WHO.
- Armstrong T, Bauman A & Davies J (2000) *Physical Activity Patterns of Australian Adults. Results of the 1999 National Physical Activity Survey*. Canberra: Australian Institute of Health and Welfare.
- Australian Bureau of Statistics (2006) *2004–05 National Health Survey: Summary of Results*. Canberra: Australian Bureau of Statistics.
- McLennan W & Podger A (1998) *Nutrient Intakes and Physical Measurements*. Canberra: Australian Government Publishing Service.
- Bittman M (1995) Changes at the heart of family households: family responsibilities in Australia 1974–1992. *Family Matters* **40**, 10–15.
- Ball K, Brown W & Crawford D (2002) Who does not gain weight? Prevalence and predictors of weight maintenance in young women. *Int J Obes Relat Metab Disord* **26**, 1570–1578.
- Trost SG, Owen N, Bauman AE, Sallis JF & Brown W (2002) Correlates of adults' participation in physical activity: review and update. *Med Sci Sports Exerc* **34**, 1996–2001.
- Andajani-Sutjahjo S, Ball K, Warren N, Inglis V & Crawford D (2004) Perceived personal, social and environmental barriers to weight maintenance among young women: a community survey. *Int J Behav Nutr Phys Act* **1**, 15.
- Inglis V, Ball K & Crawford D (2005) Why do women of low socioeconomic status have poorer dietary behaviours than women of higher socioeconomic status? A qualitative exploration. *Appetite* **45**, 334–343.
- Gedrich K (2003) Determinants of nutritional behaviour: a multitude of levers for successful intervention? *Appetite* **41**, 231–238.
- Jabs J & Devine CM (2006) Time scarcity and food choices: an overview. *Appetite* **47**, 196–204.
- Devine CM (2005) A life course perspective: understanding food choices in time, social location, and history. *J Nutr Educ Behav* **37**, 121–128.
- Dishman RK, Sallis JF & Orenstein DR (1985) The determinants of physical activity and exercise. *Public Health Rep* **100**, 158–171.
- King AC, Taylor CB, Haskell WL & DeBusk RF (1990) Identifying strategies for increasing employee physical activity levels: findings from the Stanford/Lockheed Exercise Survey. *Health Educ Behav* **17**, 269–285.
- Clark J (2003) Women too busy to exercise. *BMJ* **326**, 467.
- Burton NW & Turrell G (2000) Occupation, hours worked, and leisure-time physical activity. *Prev Med* **31**, 673–681.
- Jabs J, Devine CM, Bisogni CA, Farrell TJ, Jastran M & Wethington E (2007) Trying to find the quickest way: employed mothers' constructions of time for food. *J Nutr Educ Behav* **39**, 18–25.
- Ziol-Guest KM, DeLeire T & Kalil A (2006) The allocation of food expenditure in married- and single-parent families. *J Consum Aff* **40**, 347–371.
- O'Dougherty M, Story M & Lytle L (2006) Food choices of young African-American and Latino adolescents: where do parents fit in? *J Am Diet Assoc* **106**, 1846–1850.
- Sherwood NE & Jeffery RW (2000) The behavioral determinants of exercise: implications for physical activity interventions. *Ann Rev Nutr* **20**, 21–44.
- Ball K, Crawford D & Warren N (2004) How feasible are healthy eating and physical activity for young women? *Public Health Nutr* **7**, 433–441.
- Ball K, Crawford D & Mishra G (2006) Socio-economic inequalities in women's fruit and vegetable intakes: a multilevel study of individual, social and environmental mediators. *Public Health Nutr* **9**, 623–630.
- Ball K, Timperio A, Salmon J, Giles-Corti B, Roberts R & Crawford D (2007) Personal, social and environmental determinants of educational inequalities in walking: a multi-level study. *J Epidemiol Community Health* **61**, 108–114.
- Australian Bureau of Statistics (1998) *National Nutrition Survey User's Guide 1995*. Canberra: ABS.
- Crawford D, Ball K, Mishra G, Salmon J & Timperio A (2007) Which food-related behaviours are associated with healthier intakes of fruits and vegetables among women? *Public Health Nutr* **10**, 256–265.
- Rutishauser I, Webb K, Abraham B & Allsopp R (2001) Evaluation of short dietary questions from the 1995 National Nutrition Survey. National Food and Nutrition Monitoring and Surveillance Project. [http://www.health.gov.au/internet/wcms/publishing.nsf/Content/B1EB027FB11FEFD0CA256F190004C81F/\\$File/evaluation.pdf](http://www.health.gov.au/internet/wcms/publishing.nsf/Content/B1EB027FB11FEFD0CA256F190004C81F/$File/evaluation.pdf) (accessed March 2007).
- Riley M, Rutishauser I & Webb K (2001) Comparison of short questions with weighed dietary records. National Food and Nutrition Monitoring and Surveillance Project. [http://www.health.gov.au/internet/wcms/publishing.nsf/Content/953C018FE1A757DECA256F190004C6C7/\\$File/comparison.pdf](http://www.health.gov.au/internet/wcms/publishing.nsf/Content/953C018FE1A757DECA256F190004C6C7/$File/comparison.pdf) (accessed March 2007).
- Kellett E, Smith A & Schmerlaib Y (1998) *Australian Guide to Healthy Eating*. Canberra: Commonwealth Department of Health and Family Services.

29. Craig C, Marshall A, Sjöström M *et al.* (2003) International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* **35**, 1381–1395.
30. Commonwealth Department of Health and Aging (1999) *National Physical Activity Guidelines for Australians*. Canberra: Australian Government, Department of Health and Aging.
31. Australian Bureau of Statistics (2005) *Child Care, Australia, June 2005*. Canberra: ABS.
32. Australian Bureau of Statistics (2006) *Trends in Women's Employment*. Canberra: ABS.
33. Wooden M & Loundes J (2001) *How Unreasonable are Long Working Hours?* Melbourne: University of Melbourne.
34. Burton NW & Turrell G (2000) Occupation, hours worked, and leisure-time physical activity. *Prev Med* **31**, 673–681.
35. Dixon J & Broom DH (2007) *The Seven Deadly Sins of Obesity: How the Modern World is Making Us Fat*. Sydney: UNSW Press.
36. Darian JC & Chicago J (1995) Segmenting by consumer time shortage. *J Consum Mark* **12**, 32.
37. Robinson JP & Godbey G (1997) *Time for Life: The Surprising Ways Americans Use Their Time*. University Park, PA: Pennsylvania State University Press.
38. Anderson P, Butcher K & Levine P (2003) Maternal employment, child care and childhood obesity. *J Health Econ* **23**, 477–505.
39. Popham F & Mitchell R (2006) Leisure time exercise and personal circumstances in the working age population: longitudinal analysis of the British household panel survey. *J Epidemiol Community Health* **60**, 274–278.