



Socioeconomic and neighbourhood inequalities in women's physical activity, diet and obesity

The SESAW study

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Executive summary

Physical inactivity and poor diets are increasingly common among adults in developed countries, including Australia. At particularly high risk are individuals who are socioeconomically disadvantaged (e.g., persons with low levels of education, low status/manual occupations, or on low incomes). While socioeconomic gradients in the prevalence of inactivity and poor diet are well documented, very little is known about the reasons for this increased risk among low socioeconomic status groups.

The SESAW (SocioEconomic Status and Activity in Women) study, funded by the National Heart Foundation and Deakin University, aimed to address this question. This study investigated the reasons that women of lower socioeconomic status are less physically active, and eat less healthy diets, than women of higher socioeconomic status. The research involved several phases, including detailed surveys with over 2000 women from different socioeconomic backgrounds, as well as an investigation of the physical activity and healthy eating opportunities in the environments where women live. Innovative geospatial technologies were used to analyse data from 'audits' of women's neighbourhood environments (for example, the availability and accessibility of food stores, and of parks/green spaces and physical activity facilities), and how these characteristics were related to physical activity and eating behaviours.

This preliminary report is primarily descriptive in nature, and is not intended to present a comprehensive coverage of all study findings. Rather, it aims to provide a "flavour" of the types of findings generated. The study has produced very rich information, which we will continue to analyse in order to address a wide range of important questions (see page 41 for examples of further questions the study data will be used to address).

Preliminary findings from the study confirm that women of low socioeconomic status are less physically active and have poorer diets (e.g., lower intakes of fruits and vegetables) than those of higher socioeconomic status. The findings also identify a number of factors, including personal (e.g., knowledge, health considerations); social (e.g., support from family and friends); and neighbourhood environment factors (e.g., walking tracks, neighbourhood design characteristics) that seem to be important influences on women's physical activity and eating behaviours, and that partly explain why women of low socioeconomic status have less healthy physical activity and eating behaviours.

People of low socioeconomic status are more likely than those of higher socioeconomic status to suffer morbidity and premature mortality from a vast range of chronic conditions, including cardiovascular disease and stroke, diabetes, cancer, obesity, and poor mental health. Reducing inequalities in access to physical activity and healthy eating opportunities will help reduce these elevated risks.

There are several significant outcomes of the project. These include a better understanding of the personal, social and environmental barriers faced by women of different socioeconomic backgrounds in adopting and maintaining healthy behaviours; as well as greater insights into the roles of personal, social and environmental factors in contributing to socioeconomic differences in women's physical activity and healthy eating. These insights can be used to inform the

development of more effective policies and programs to promote and support increased physical activity and healthy eating, particularly among those who are socioeconomically disadvantaged.

Background

Despite the well-established health benefits of regular physical activity participation and good nutrition^{2,3}, physical inactivity and poor diets are increasingly common among adults in developed countries worldwide, including Australia. Certain groups in the population are at particularly high risk of not meeting recommended guidelines for physical activity and healthy eating. For example, individuals who are socioeconomically disadvantaged (e.g., persons with low levels of education, low status manual occupations, or on low incomes) have been consistently found to have less health-promoting physical activity and eating behaviours than those of higher socioeconomic status^{2, 4-8}. Sedentary behaviour is not merely the opposite of physical activity, but rather a class of behaviours involving low levels of energy expenditure (e.g., watching TV, sitting reading, playing video games) that may co-exist with physical activity. Individuals of low socioeconomic status are also more likely to be sedentary in their leisure-time⁸. While socioeconomic gradients in the prevalence of inactivity, sedentary behaviours and poor diet are well documented, the mechanisms underlying these inequalities are currently poorly understood.

Research shows that our decisions to participate in physical activity, or to eat a healthy diet, are strongly influenced by personal factors (e.g., our motivation; our enjoyment of activity and preferences for certain foods; the values we place on our health)^{9,10}. However, these behaviours are also influenced by broader factors within our social and physical environments. For example, social support for healthy eating from friends, spouse and family can impact our eating behaviours; and participation in social groups, as well as neighbourhood social capital and safety, are thought to promote greater levels of physical activity. Factors within both the natural (e.g., coastal proximity, rivers, topography) and built (e.g., supermarket infrastructure, proximity/access to shops/facilities, public transport, green space, road connectivity) environments are also likely to influence both our eating and physical activity behaviours. However, the relative influence of these personal, social and environmental factors on behaviour; the extent to which these factors vary across socioeconomic groups; and whether such variations explain socioeconomic inequalities in physical activity and eating behaviours, are currently poorly understood. These were the questions of interest in this study.

Women are an important target group to study in terms of physical activity and healthy eating, for a number of reasons. In developed countries, including Australia, women tend to be less physically active than men throughout most of the lifespan¹¹. Further, despite their increased participation in the labour market in recent decades, women are still primarily responsible for the majority of household tasks in families¹², including shopping and food selection and preparation. They are thus thought to be important 'gatekeepers' in terms of family food consumption. An understanding of the socioeconomic influences on the diets of women, therefore, may also provide insights into those influences on the diets of other family members. In addition, traditionally studies of socioeconomic inequalities in health outcomes have focused more often on men, and hence less is understood about socioeconomic influences on women's health. For these reasons, women were the focus of the present study.

Study aims

This study aimed to investigate the contributions of personal, social and physical environmental factors in influencing women's physical activity and eating behaviours, and in explaining socioeconomic inequalities in these behaviours.

The study also provided an opportunity to examine the personal, social and environmental determinants of selected health outcomes among women, including overweight/obesity; self-rated health; and mental health and well-being. The contributions of personal, social and physical environmental factors to explaining socioeconomic inequalities in these health outcomes are also examined.

The purpose of this report is to provide an overview of the key findings to emerge from the study to date (analyses are ongoing). This report will be of interest to researchers, practitioners, policy-makers, and government and non-government organizations involved in understanding and promoting physical activity, healthy eating and healthy body weight; women's health; healthy neighbourhoods/communities; and social justice and the reduction of socioeconomic inequalities in healthy behaviours.

Study methods

Study design

This study incorporated three main phases:

1. qualitative in-depth interviews with 56 women (not reported here; see publications list for further details)
2. a detailed self-report survey on physical activity, completed by 1554 women, and a detailed self-reported survey on healthy eating, completed by 1580 women
3. an objective audit of the physical activity and food environments in the local neighbourhoods in which survey participants lived

Participants and recruitment

Participants were recruited from 45 Melbourne neighbourhoods (suburbs) of different levels of socioeconomic disadvantage (based on the Australian Bureau of Statistics' SEIFA – Socioeconomic Index for Areas). Fifteen suburbs of low SEIFA, 15 of mid and 15 of high SEIFA were selected randomly, and the Electoral Roll was then used to randomly select women aged between 18 and 65 years from each of these 45 neighbourhoods. Two separate samples of women were posted either a physical activity survey or a healthy eating survey. A total of 1554 women completed the physical activity survey; 1580 women completed the healthy eating survey.

Procedures

- Women were posted the surveys and invited to participate in the study by returning a completed survey
- Women who returned their completed physical activity or healthy eating survey were given the opportunity to complete the alternative survey also
- Objective audits were undertaken by the investigators, to assess the physical activity and food environments in the 45 neighbourhoods in which participants lived
- Audit data on the neighbourhood environments were linked with survey data provided by individual women to provide a complete picture of personal and social, as well as environmental influences on behaviour

Measures

Survey measures

The following measures were included in the **self-report surveys**:

Participant information: Demographic information including age, marital status, family/household composition, number/ages of children, ethnicity, housing tenure and car access.

Socioeconomic status: Education level, employment status and occupation, and income were assessed. In addition, questions assessed the socioeconomic characteristics of women's partner (if applicable); and of the women's parents during the women's childhood.

Physical activity behaviours: Time spent in walking, moderate- and vigorous-intensity physical activity in leisure-time, for transport, household/domestic activity, and occupational physical activity in the previous week were all assessed. The proportion of activity done within women's OWN neighbourhood was also assessed. Women also reported the time they had spent in sedentary behaviours (total; TV viewing; computer use).

Influences on physical activity: These included:

Personal factors: Physical activity history; self-efficacy; enjoyment; preferences; intentions; stress; and perceived barriers to physical activity.

Social and familial factors: Social support for physical activity from partner/family, and from friends and work colleagues; pet ownership; belonging to a leisure/sport/exercise group/club; participation in social outings; social capital within the local neighbourhood.

Environmental perceptions: Aesthetics; safety; availability and convenience of public recreation facilities; neighbourhood infrastructure (e.g., lights, footpaths) and barriers (e.g., dogs, traffic); facilities in workplaces.

Eating behaviours: Frequency of consumption of a wide range of fruits and vegetables; fast food consumption; consumption of other restaurant meals; of

snacks and high fat foods; and of ready-made, frozen convenience foods; meal patterns; low-fat food behaviours (e.g., trimming meat of fat; using low-fat spreads).

Shopping and meal preparation: behaviours were also assessed (e.g., when and where shopping is done and by whom; use of a shopping list; reading nutritional labels; etc).

Influences on healthy eating: These included:

Personal factors: Nutrition knowledge; self-efficacy; intentions; taste preferences; purchasing considerations (health, cost, family preferences, etc); perceptions of dietary adequacy; cooking skills; barriers to healthy eating.

Social factors: Social support for healthy eating from partner and family; from friends and work colleagues; participation in social outings; eating with others.

Environmental perceptions: Perceived availability and accessibility of supermarkets and other food stores in local neighbourhood; perceived availability and accessibility of fast food outlets in local neighbourhood; perceived quality and cost of fresh foods locally.

Additional health outcomes: Height and weight were self-reported and used to calculate women's body mass index (BMI). Subjective well-being and self-rated overall health were also assessed. Mental health was assessed with the General Health Questionnaire¹³.

All of the above measures can be examined in the sample as a whole; in the 45 different neighbourhoods; and across socioeconomic categories (e.g., comparing women with low and high education).

Objective neighbourhood audit measures

The below measures were derived for each of the 45 study neighbourhoods. These measures were generated using existing spatial datasets where available (owned by the Australian Research Centre for Urban Ecology [ARCUE] and the state of Victoria*), which were analysed using a Geographic Information System (GIS); or collated through such sources as telephone directories (white and yellow pages), company websites, council lists and other registers.

As well as the availability/density of facilities/shops in each neighbourhood, the proximity of each facility/shop to participants' homes can be assessed.

Physical activity environments: Density and proximity to: parks and public open space; gyms; community recreation/sporting centres, swimming pools, netball and basketball courts, bowling alleys, martial arts centres, squash, cricket, football, and soccer facilities; walking/bicycle paths; and natural facilities including rivers and beaches. Public transport networks and coverage; road connectivity, land use mix and crime rates/types (statistics from Victoria Police) were also assessed across the 45 study neighbourhoods.

Food environments: Density and proximity to: large supermarkets; major fast food chains; fresh food markets; greengrocers; specialty stores (e.g., bakeries, butchers).

Neighbourhood land areas (m²) and population data were also obtained.

Due to the breadth and richness of the data collected, it was not possible to present all findings in this report. Therefore, a subset of just some of these measures is presented, to illustrate the key preliminary findings.

*The state of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the state of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

Characteristics of participants

Participants were aged between 18 and 65 years (mean age 42 years) (Table 1). Table 1 summarizes the demographic and socioeconomic characteristics of participants completing the physical activity and healthy eating surveys.

Table 1: Characteristics of participating women

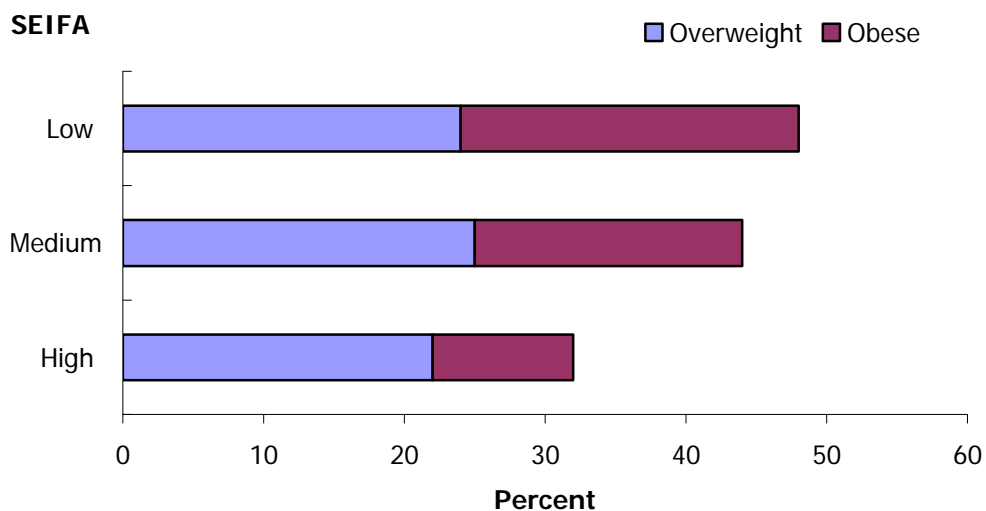
	Physical Activity Survey (n=1554)	Healthy Eating Survey (n=1580)
Age (mean)	42	42
Country of origin (%)		
Born in Australia	75	76
Born in the UK	4	4
Other	21	20
Children up to 18 years of age living at home (%)	40	40
Education level (%)		
No formal qualifications / up to year 10	22	23
Year 12 / apprentice / diploma or certificate	41	40
University degree or higher degree	37	37
Employment Status (%)		
Working full-time / part-time	63	62
Unemployed or laid off / looking for work	4	4
Keeping house and/or raising children full-time	17	18
Studying full-time	7	7
Retired	9	9
Occupation (%)		
Manager / professional	43	42
Tradesperson / intermediate clerical / service worker	26	24
Transport worker / elementary clerical / sales / service worker	10	9
No paid work / student	22	24
Income (%)		
Less than \$500 per week	41	40
\$500 to \$999 per week	29	29
\$1000 or more per week	15	15
Don't know / Don't want to answer	16	17

Marital status (%)		
Married / De facto	64	66
Separated / widowed or divorced	13	12
Never married	22	22

Preliminary findings: Overweight and obesity

In general, there were higher proportions of overweight and obese respondents in the disadvantaged neighbourhoods (with lower SEIFA scores) compared with less disadvantaged neighbourhoods.

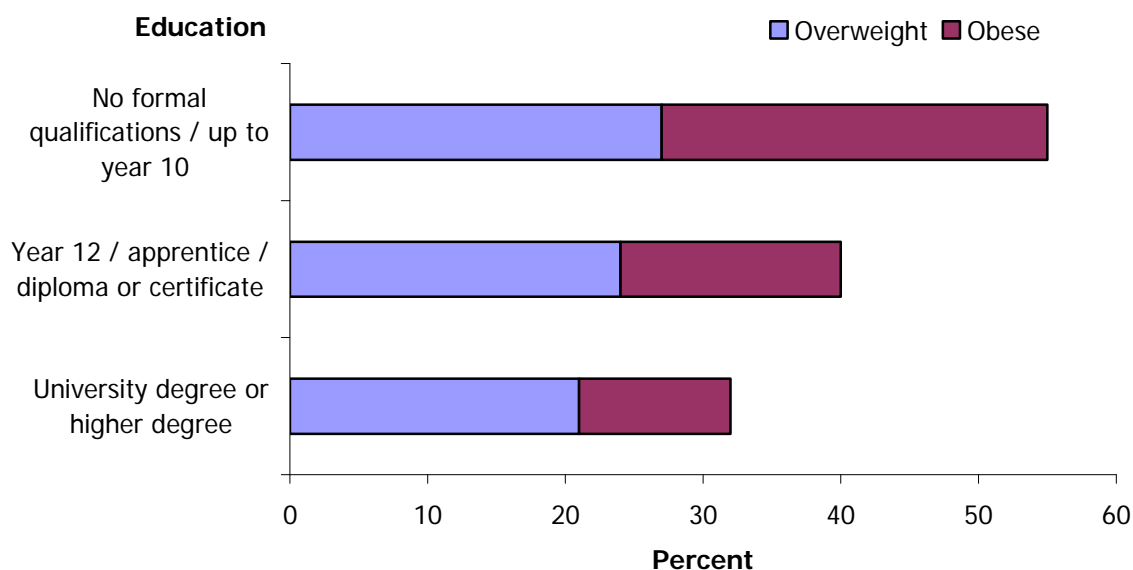
Figure 2: Overweight/obesity by SEIFA



As well as showing variations by neighbourhood level disadvantage, overweight and obesity also showed gradients by women's individual socioeconomic status. As Figure 3 illustrates, overweight and obesity were more common among women with lower levels of education than those who were more highly educated. While not presented here, similar gradients were found for women's occupational category and income.

For these (and most of the data presented in this report), analyses can also be presented by occupation, income and neighbourhood disadvantage; however for simplicity, in many cases we have presented data for just one of these indicators.

Figure 3: Overweight/obesity by education



Preliminary findings: Physical activity

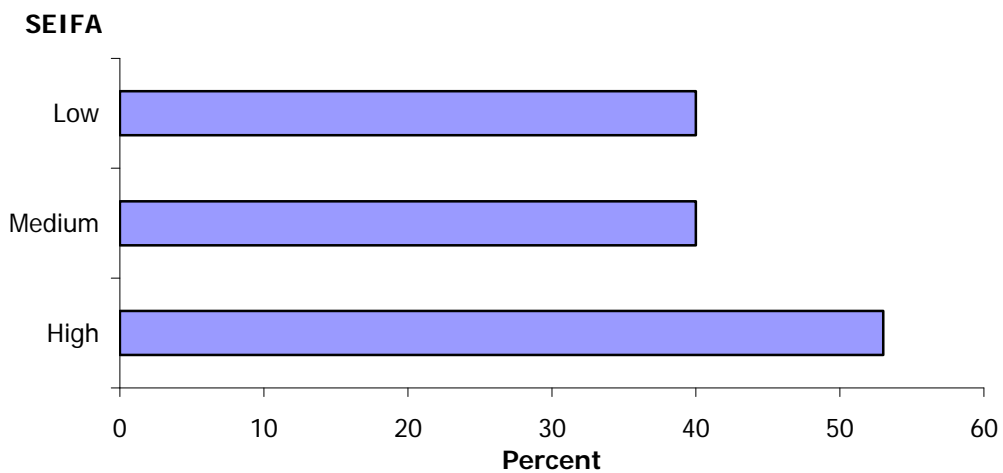
How much physical activity are women doing in their leisure time?

Almost two-thirds of women (65%) reported that they had walked in their leisure-time in the past week (for on average 3 hours in total over the week). Just under a third (27%) reported doing other moderate-intensity activity, and 31% reported vigorous physical activity in the past week.

Current physical activity guidelines recommend that adults participate in at least 30 minutes of moderate-intensity physical activity on most or all days of the week. This is commonly interpreted as comprising at least 150 minutes of physical activity in total per week (i.e., 30 minutes x 5 days).

In this study, the proportion of women undertaking 150 minutes or more of physical activity in their leisure-time was 44%. This proportion varied across neighbourhoods, as shown in Figures 4 and 5. In general, women living in socioeconomically disadvantaged neighbourhoods were less likely to meet this physical activity guideline.

Figure 5: Proportion of women meeting physical activity guideline by SEIFA



The proportion of women achieving the recommended amount of physical activity in their leisure-time also varied by women’s individual socioeconomic status.

As Figures 6 and 7 illustrate, women with higher levels of education, and those with managerial/professional occupations, were more likely to meet the physical activity guideline than women with lower education levels, or those in lower status occupations (categorized consistent with the Australian Bureau of Statistics’ Standard Classification of Occupations¹⁴).

Figure 6: Proportion of women meeting physical activity guideline by education

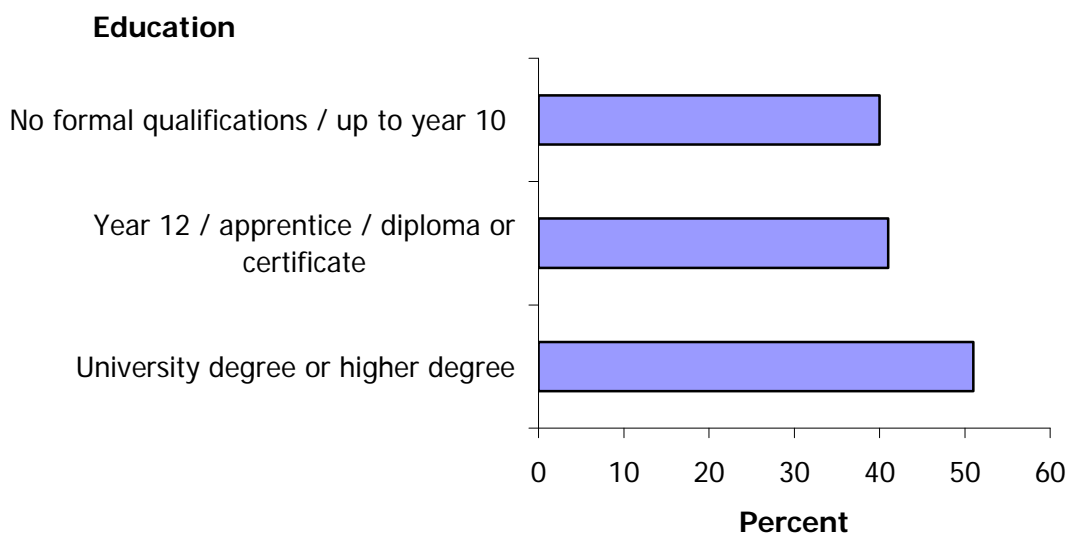
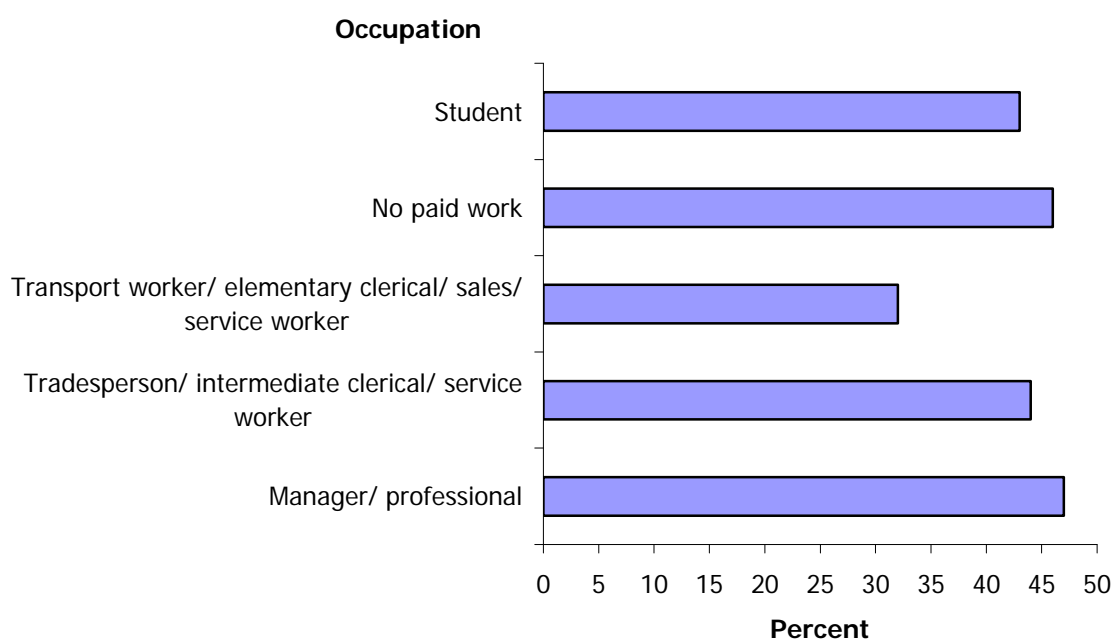


Figure 7 shows that the proportions of women meeting the physical activity guideline were similar for those who were employed in professional/managerial occupations,

and those who were students or had no paid work. This non-linear relationship between occupational status and physical activity reflects the complexity of using occupation as an indicator of socioeconomic status among women. For instance, women with no paid work may be unemployed and looking for work, or alternatively they may have spouses with high incomes and choose not to engage in the paid workforce. The 'no paid work' occupational category is therefore unlikely to comprise a homogenous group, and women in this category should not be assumed to have low socioeconomic status.

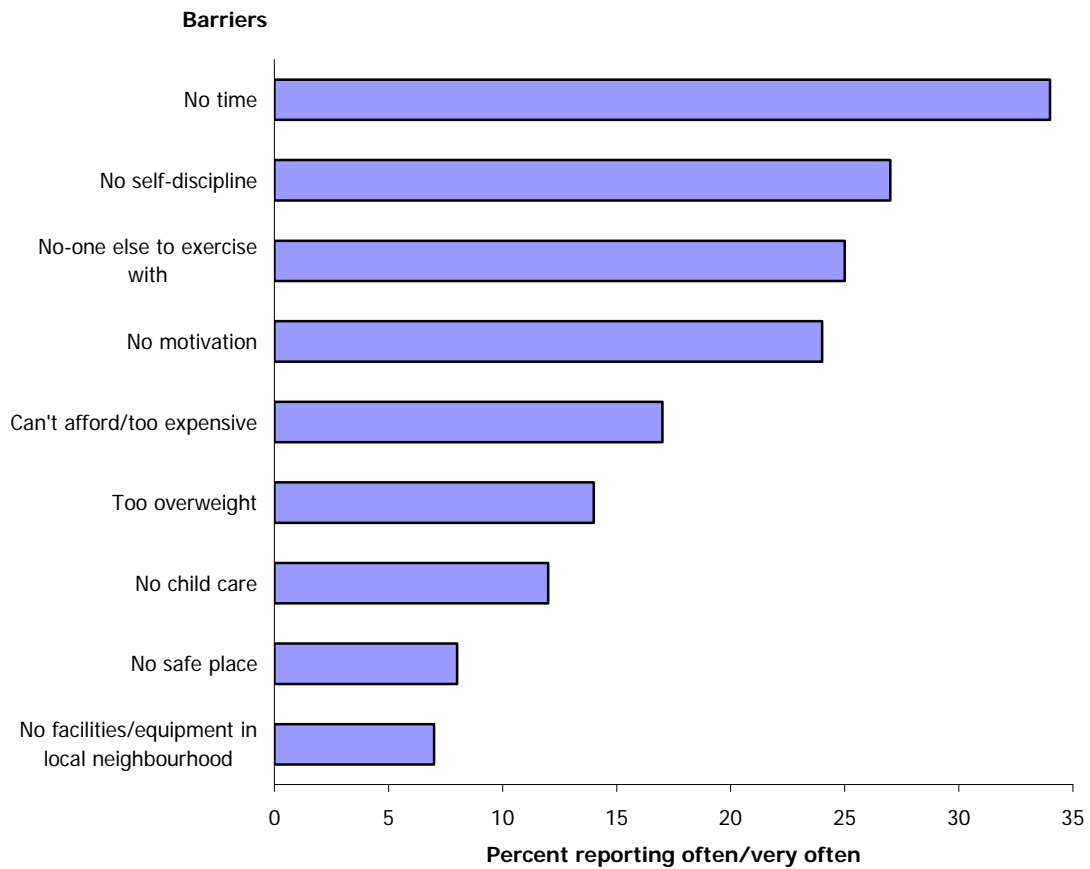
Figure 7: Proportion of women meeting physical activity guideline by occupation



What are the barriers to being physically active?

Women reported a number of factors that frequently made it difficult for them to be more physically active. As Figure 14 shows, lack of time was a very common barrier, reported 'often' or 'very often' by over a third of the women (note not all barriers assessed are presented here).

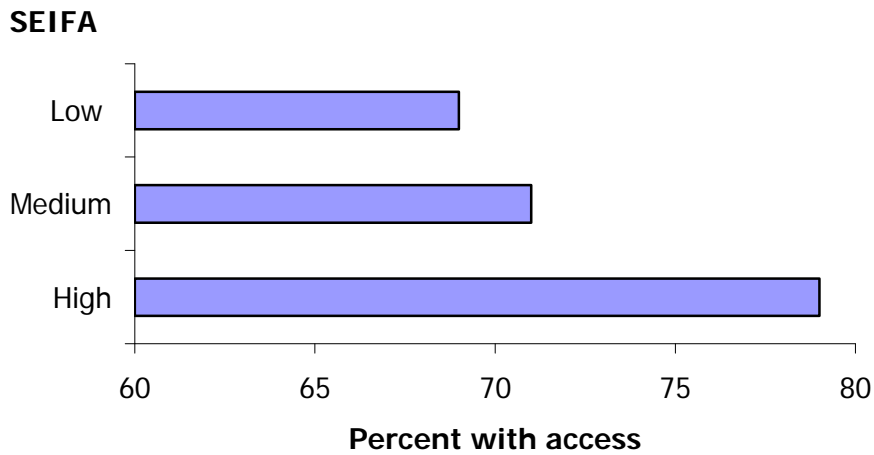
Figure 14: Common barriers to physical activity



Access to child care

Of those for whom this question was applicable (32% of the sample), most women (72%) reported having access to care (either at a child care centre, or from a partner/family member or a friend) which they could use when they wanted to be physically active without their children. This varied slightly by neighbourhood, however, with women living in disadvantaged neighbourhoods less likely to have child care available than those living in more advantaged neighbourhoods (see Figure 15).

Figure 15: Access to child care by SEIFA



Preliminary findings: Healthy Eating

As illustrated in Figures 23 through 26, the likelihood of consuming two or more serves of fruits and of vegetables varied by all of the indicators of socioeconomic status. Generally, women living in more disadvantaged neighbourhoods; with lower education levels; and with lower incomes were at increased risk of not consuming enough fruit and vegetables for good health compared with other women.

Figure 23: Proportion of women eating 2 or more serves of fruit and vegetables daily, by SEIFA

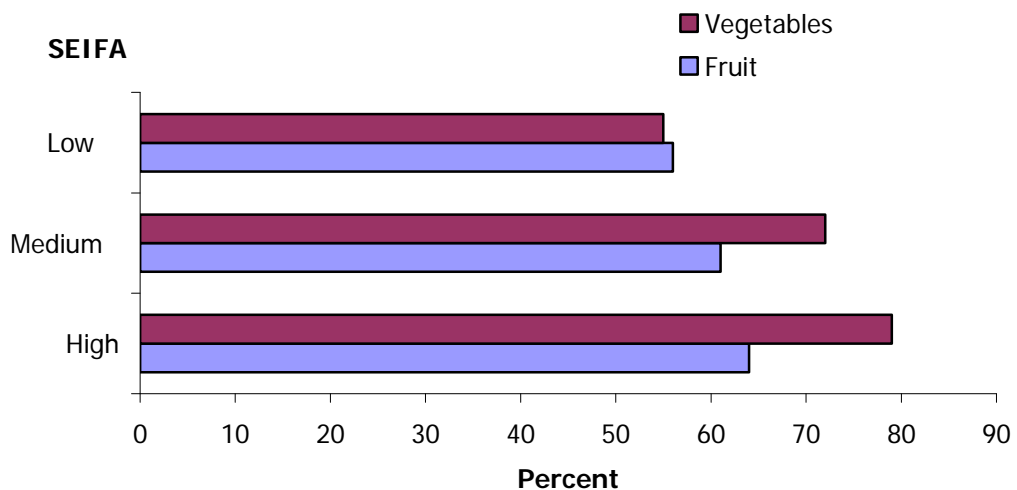


Figure 24: Proportion of women eating 2 or more serves of fruit and vegetables daily, by education

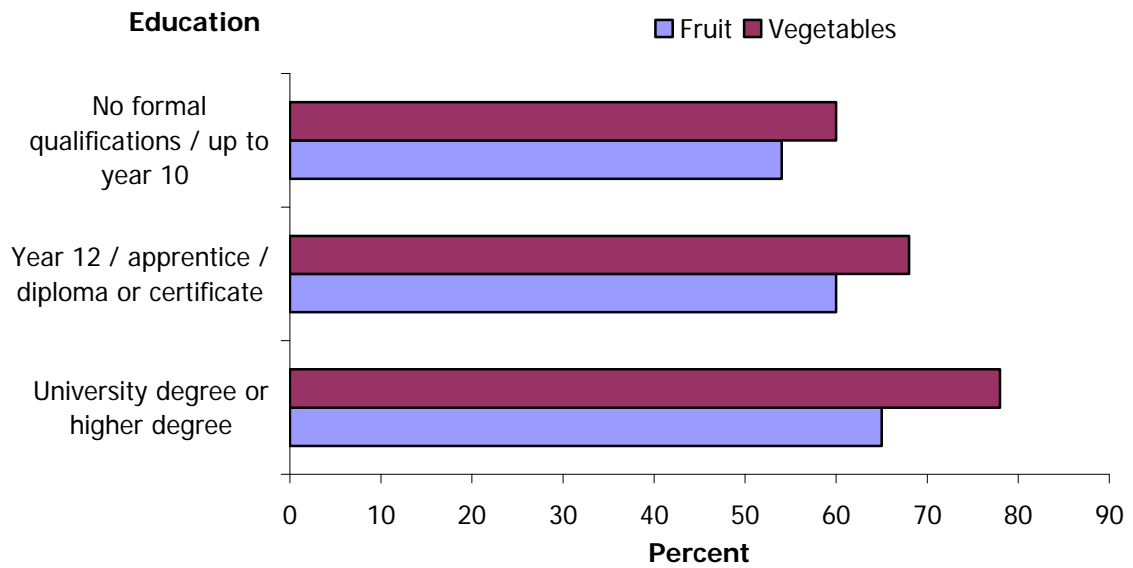
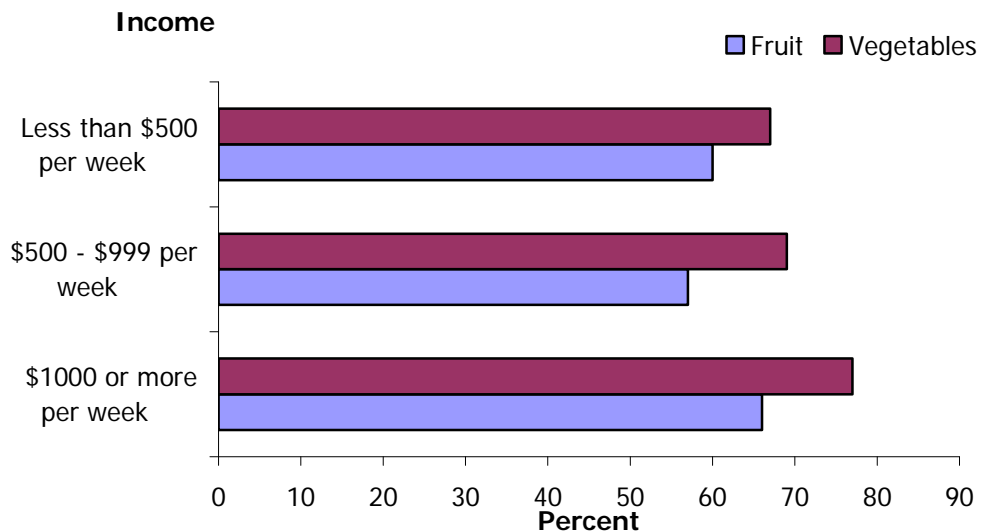


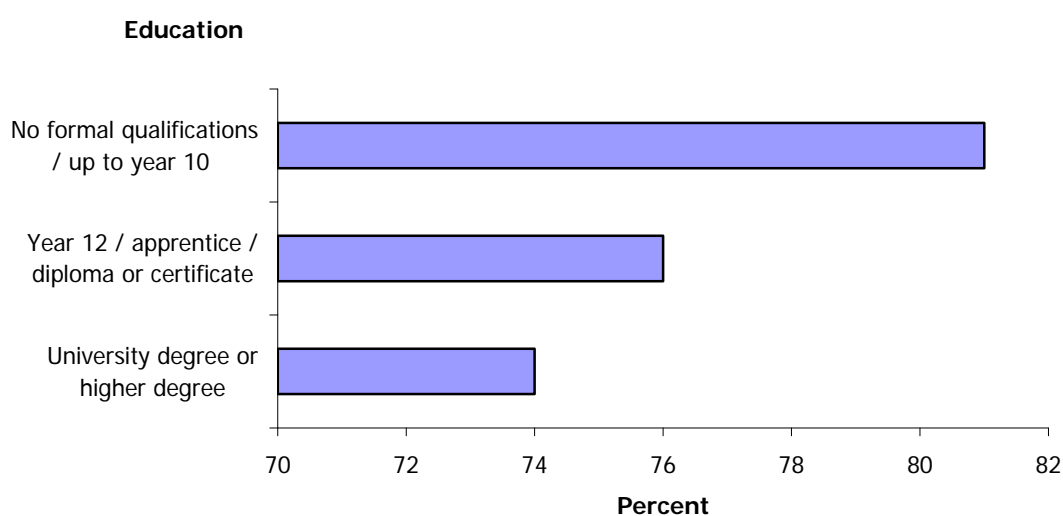
Figure 25: Proportion of women eating 2 or more serves of fruit and vegetables daily, by income



Where do women shop for food?

When asked where they typically purchase their food, 76% of women responded that most or all of their food shopping was done at large supermarkets (more common among women with low education, occupation and income – see Figure 27 for an example). Sixteen percent reported doing most of their shopping at fresh food markets; 14% at specialty shops (such as bakery, greengrocer, butcher), and 4% of women purchased most/all of their food from small grocery or convenience stores.

Figure 27: Proportion of women doing most/all of their food shopping in large supermarkets, by education

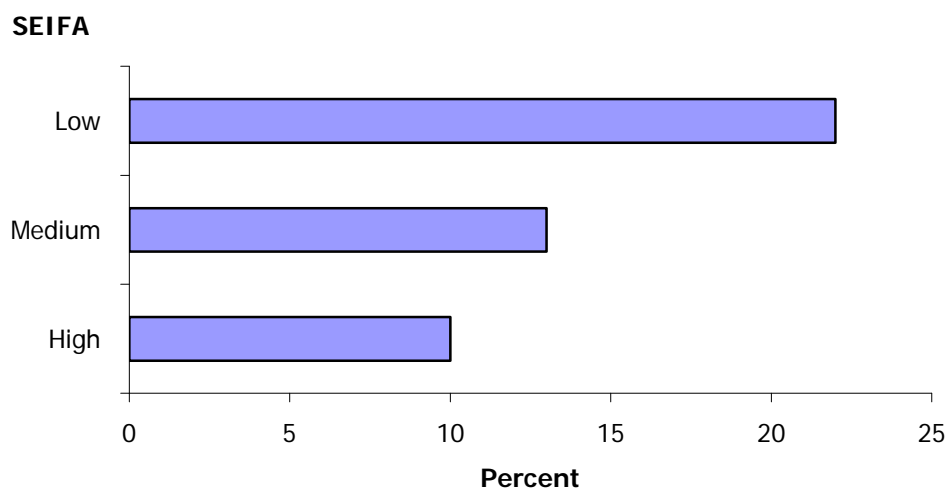


What are women's eating behaviours like?

Fast food

Fourteen percent of women reported eating fast food at fast food restaurants about once a week or more; 43% did so less than once a week, and 43% 'never/rarely' ate at fast food restaurants. Strong socioeconomic gradients in this behaviour were observed. For example, Figure 29 shows that women living in disadvantaged neighbourhoods were more likely than women living in less disadvantaged neighbourhoods to eat at fast food restaurants at least weekly. Similar patterns were found by income.

Figure 29: Proportion of women eating at fast food restaurants at least weekly, by SEIFA



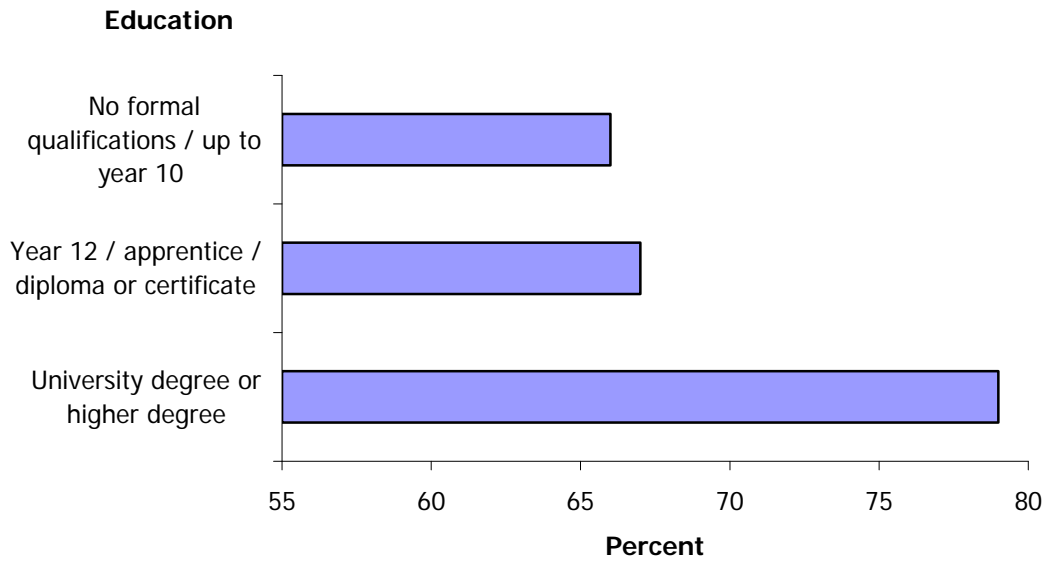
Snacking

Frequent snacking was relatively common among women in this sample. Sixty percent of women reported usually consuming two or three snacks per day (including evenings), 4% consumed more than four snacks per day, and only 7% reported not snacking at all.

Skipping breakfast

Fewer than three-quarters of the sample (71%) reported that they usually ate breakfast five or more days per week, while 11% rarely or never ate breakfast. Regular breakfast consumption was more common among women with higher education (see Figure 30), occupational status, income and living in less disadvantaged neighbourhoods.

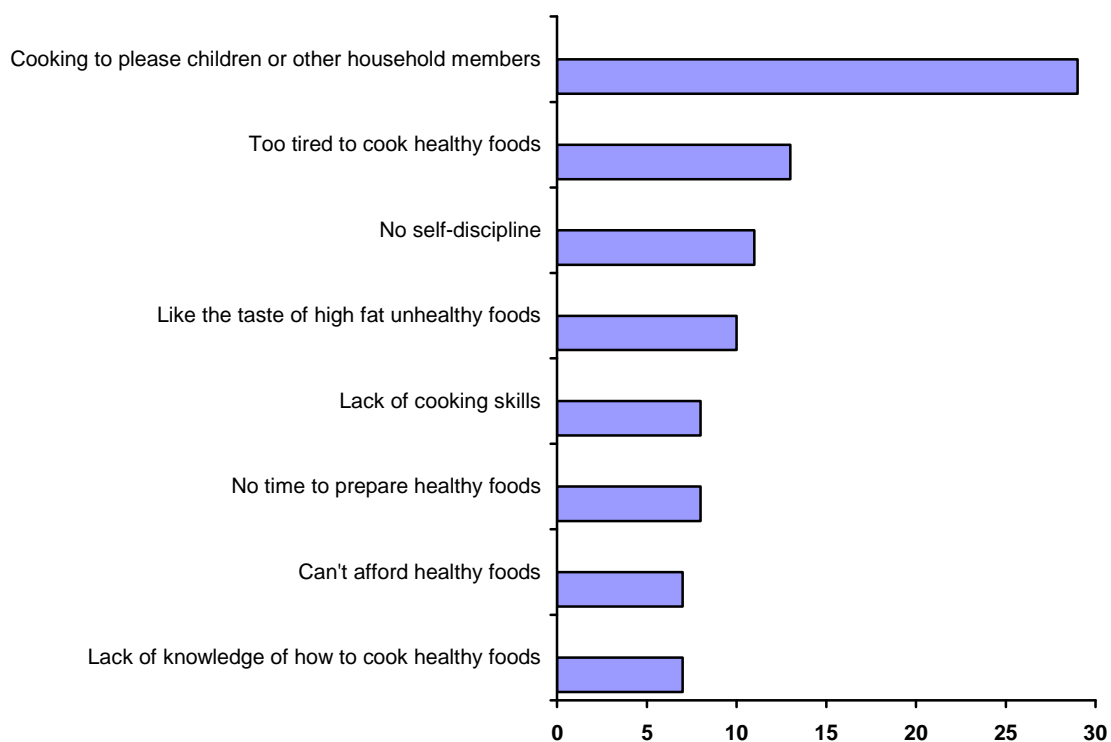
Figure 30: Proportion of women eating breakfast five or more times per week by education



What are the barriers to healthy eating?

Figure 31 shows some of the barriers to healthy eating reported by women “often” or “very often”. Several of these perceived barriers varied across socioeconomic groups. For example, women of low education were more likely to report that not being able to afford healthy foods, and lack of knowledge of how to cook healthy foods, were often/very often barriers to healthy eating for them.

Figure 31: Common barriers to healthy eating



Objective neighbourhood environments

In addition to collecting information on women’s perceptions of their neighbourhood food environment, we also collected objective data on the food characteristics of the neighbourhoods in which women lived. For example, we assessed the availability and accessibility of supermarkets, fruit and vegetable stores and greengrocers, fresh food markets, and major fast food outlets. Analysis of these rich data is continuing; preliminary results are presented below.

Figure 34 shows that the number of supermarkets per 10,000 residents in low SEIFA (most socioeconomically disadvantaged) neighbourhoods was actually higher than that in mid and high SEIFA neighbourhoods. In contrast, Figure 35 shows that residents of low and mid SEIFA neighbourhoods were more disadvantaged in terms of availability of fruit and vegetable stores/greengrocers. Furthermore, the availability of major fast food outlets was relatively greater in the most socioeconomically disadvantaged neighbourhoods (Figure 36).

Figure 34: Number of large supermarkets per 10,000 residents, by SEIFA

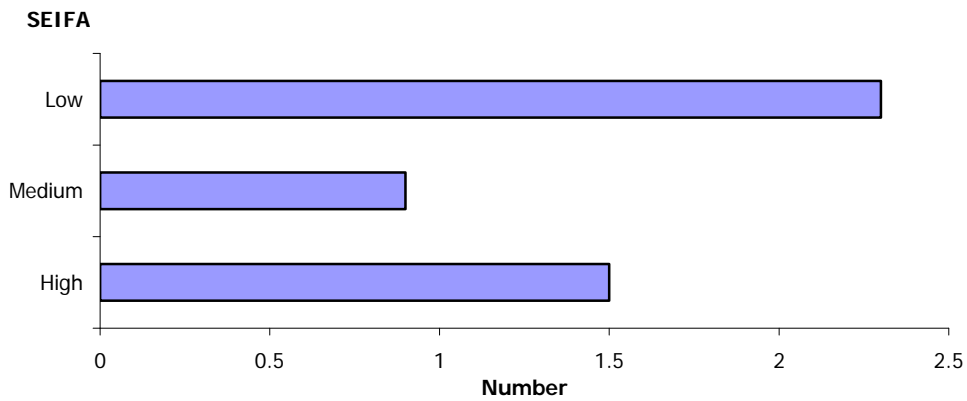


Figure 35: Number of fruit/vegetable stores/greengrocers per 10,000 residents, by SEIFA

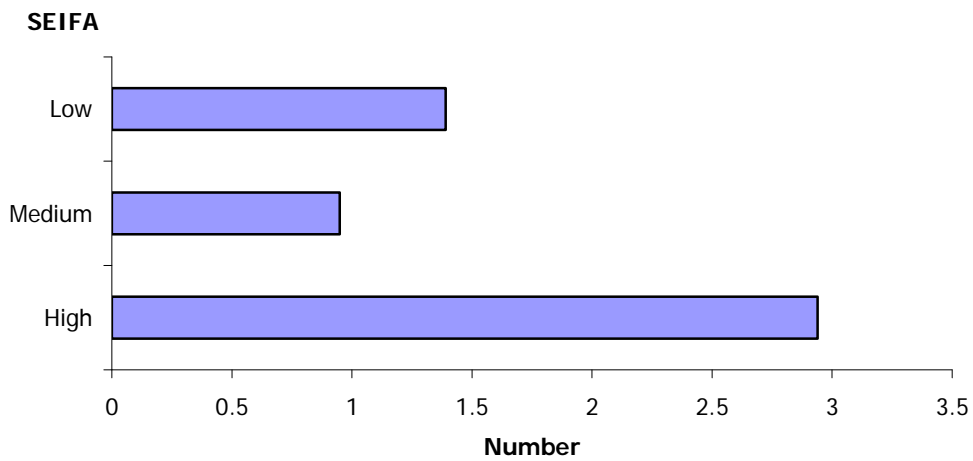
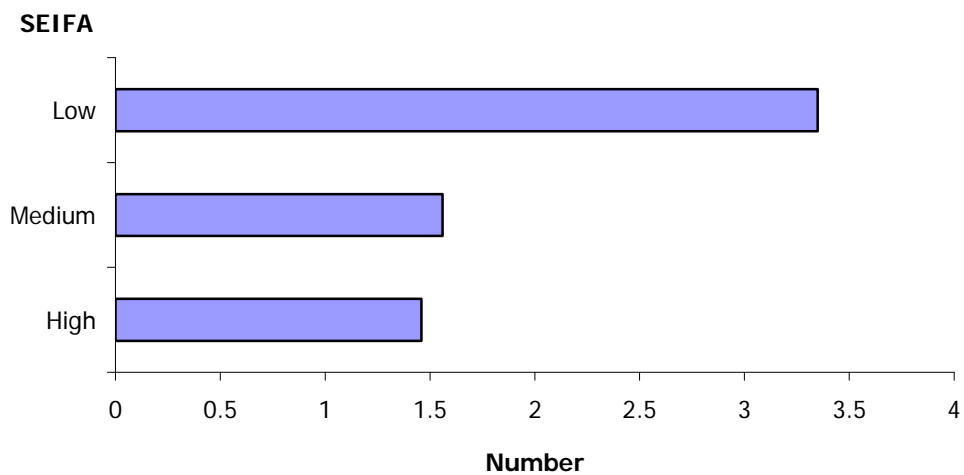


Figure 36: Number of major fast food outlets per 10,000 residents, by SEIFA



Future in-depth analyses

The data presented in this report provided an interesting picture of physical activity and eating behaviours, and correlates of these behaviours, among women across 45 neighbourhoods of Melbourne. These rich descriptive data also provide some important insights into personal, social and environmental factors that might help to explain the less healthy physical activity and eating behaviours observed among women of lower socioeconomic status (i.e., lower education, lower occupational status, lower income, and/or living in more socioeconomically disadvantaged neighbourhoods).

More in-depth analyses are required in order to provide a detailed understanding of the extent to which the various personal, social and environmental factors examined here, contribute to explaining socioeconomic variations in women's physical activity and eating behaviours. We have undertaken preliminary analyses of this nature. Due to the amount and richness of the data collected, these investigations will be ongoing; however, preliminary findings are presented as an example below.

In the first set of analyses, we investigated women's nutrition knowledge; health considerations related to food purchasing; social support for healthy eating; and availability of supermarkets and fruit and vegetable stores in the local neighbourhood. We conducted multilevel analyses to investigate the extent to which these different factors contributed to explaining education-level gradients in women's fruit and vegetable intakes (for instance, 'Is the lower intake of vegetables among women with low education, due to their poorer nutrition knowledge? Or to the lack of supermarkets in their local neighbourhoods?').

Findings revealed that both personal factors (nutrition knowledge, health considerations), as well as social factors (social support for healthy eating from family and friends/colleagues) were important explanatory factors, accounting for some of the educational gradients observed in women's fruit and vegetable intakes. Food environmental factors (availability of supermarkets, fruit and vegetable stores in the local neighbourhood) did not explain the lower fruit and vegetable intakes among women with lower education levels.

Further analyses are continuing to investigate other personal, social and environmental factors that may be important contributors to the socioeconomic gradients in women's diets. In addition, similar analyses are underway to investigate those factors that explain socioeconomic gradients in women's physical activity levels; obesity risk; and physical and mental well-being; and to answer many additional related questions such as those posed on the next page.

Examples of further questions to be addressed

This study generated a wealth of information, and we plan to continue to analyse the data to answer many additional important questions, such as:

- Which personal, social and environmental factors contribute to socioeconomic inequalities in women's physical activity and eating? Where should we focus our attention in **health promotion programs/policies** aimed at **reducing inequalities**?
- Which personal, social and neighbourhood environmental factors are most strongly associated with women's **leisure-time walking**? with **other leisure time physical activity**? with **transport-related physical activity**? with women's **fruit and vegetable** intakes? with their consumption of **fast food** and other **high fat foods**? with risk of **obesity**?
- Which **personal factors** are most strongly associated with these behaviours: e.g., **enjoyment**? **intentions**? **self-efficacy**? **perceived barriers**?
- Which **social factors** are most important? **Social support** from partner/family, or from friends/colleagues? regular **social outings**? **social capital**?
- Which **environmental factors** are most important? **Public open space/parks**? Density of/proximity to **shops/facilities**? An **aesthetically pleasant** neighbourhood? **Road connectivity**? **Crime rates**?
- In which Melbourne neighbourhoods do women engage in most **transport-related physical activity** (e.g., walking/cycling to work)?
- In which neighbourhoods do women have the highest **fast food** intakes? highest intakes of **high-fat foods**?
- Which **characteristics of neighbourhoods** are most important for healthy physical activity and eating behaviours? Which **neighbourhoods** have the **optimal physical activity and healthy eating environments**?
- In which neighbourhoods are women most likely to be at risk of **overweight/obesity**? Do **neighbourhood characteristics** explain this increased risk?
- Which **indicators (education/occupation/income/SEIFA)** are most predictive of women's physical activity/diet? Does neighbourhood disadvantage play a role independently, above & beyond that of individual socioeconomic status?
- Which neighbourhoods have the greatest levels of **social capital**? Which neighbourhood characteristics are associated with greater **social capital**? How is **social capital** related to walking and other forms of physical activity?

- In which neighbourhoods do women have the most/least favourable **mental health**? Which personal, social and neighbourhood environmental factors are associated **with better mental health**?

Summary and conclusions

Socioeconomic status is arguably one of the most important influences on health and well-being. Socioeconomic gradients in key health behaviours such as eating and physical activity represent important pathways by which socioeconomic status impacts on health. Therefore, understanding and addressing socioeconomic variations in healthy eating and physical activity is a critical priority for efforts to reduce socioeconomic health disparities observed worldwide.

The SESAW study is one of the first studies internationally to investigate concurrently the personal, social, and perceived and objective environmental factors that contribute to socioeconomic gradients in women's diet and physical activity. The findings highlight a number of factors within each of these domains that may be important in explaining women's participation in health-promoting physical activity and eating behaviours, and also in explaining the lower participation in these behaviours among women of low socioeconomic status.

Consistent with a large body of international studies, the SESAW study confirmed striking socioeconomic gradients in women's leisure-time physical activity; their intakes of fruit and vegetables; and their risk for obesity. Several more novel findings also emerged: women of low socioeconomic status, for example, spent more time watching television, but were less likely to walk for transport, than women of higher socioeconomic status. In addition, the findings provide insight into the complexity of relationships between socioeconomic status and various physical activity and dietary outcomes. While the associations of socioeconomic status with physical activity, diet and their determinants varied at times depending on the socioeconomic indicator used, in general there was consistency across indicators, suggesting that the relationships reported were very robust.

Potential determinants of physical activity which were found to vary across socioeconomic groups (generally disadvantaging those of lowest socioeconomic status) included membership of a sporting group or club; access to child care; perceived social capital in the local neighbourhood; the availability of walking tracks; and street connectivity in the local neighbourhood. Further analyses are currently underway to tease out the relative importance of these and other factors in contributing to the increased risk among women of low socioeconomic status of not participating in sufficient physical activity for health.

In terms of healthy eating, determinants which were found to vary across socioeconomic groups included nutrition knowledge; meal behaviours, such as skipping breakfast; use of fast food restaurants; social support for healthy eating; shopping locations; perceived ability to afford healthy foods; and availability of fruit and vegetable stores/greengrocers and fast food outlets. Preliminary analyses suggest that personal and social factors (e.g., nutrition knowledge, social support for healthy eating) were more important than availability of supermarkets/stores, in explaining the lower intakes of fruits and vegetables among women of lower socioeconomic status. Again, however, investigations of the vast array of dietary determinants and their contribution to socioeconomic variations in diet are ongoing.

An enhanced understanding of the contributions of personal, social and environmental factors to women's physical activity and eating behaviours, and to the

well-established socioeconomic gradients in these behaviours, is critical in order to promote healthier lifestyles among women, and to reduce the burden of disease associated with physical inactivity and poor diets, particularly among those most disadvantaged. This study has provided important information from which insights towards this understanding can be developed.

Publications from the study to date

Published papers

Ball K, Inglis V, Crawford D, Salmon J. Why do women of low socioeconomic status have poorer diets than women of higher socioeconomic status? *International Journal of Behavioral Medicine* 2004;11(Suppl): 223-224.

Ball K, Crawford D, Giles-Corti B, Salmon J. Poor and sedentary: why are women of low socioeconomic status less physically active than women of higher socioeconomic status? *International Journal of Behavioral Medicine* 2004; 11(Suppl): 138.

Inglis V, Ball K, Crawford D. (in press, accepted May 2005). Why do women of low socioeconomic status have poorer diets than women of higher socioeconomic status? A qualitative exploration. *Appetite*.

Submitted papers

Ball K, Crawford D, Mishra G. (submitted). Socioeconomic inequalities in women's fruit and vegetable intakes: A multilevel study. *Public Health Nutrition*.

Ball K, Salmon J, Giles-Corti B, Crawford D. (submitted). Why are women of low socioeconomic status less physically active than women of higher socioeconomic status? A qualitative study. *Women and Health*.

Invited presentations

Ball K. (2005, June). Socioeconomic differences in diet and physical activity: The role of individual mediators. Invited symposium presentation, Annual Meeting of the International Society for Behavioural Nutrition and Physical Activity, Amsterdam, The Netherlands.

Ball K, Timperio A, Crawford D. (2005, June). Understanding the role of individual, social and environmental influences on eating and physical activity in children and adults. Invited seminar presentation, Erasmus University Department of Public Health, Rotterdam, The Netherlands.

Ball K. (2005, March). A greater challenge for some: Socioeconomic disadvantage and obesity. Seminar for the Australian Centre for Obesity Research and Education, Melbourne, Australia.

Ball K. (2004, September). Why do women of low socioeconomic status have poorer diets and lower physical activity levels than women of higher socioeconomic status? Invited presentation, Health Behaviour Unit, Department of Epidemiology and Public Health, University College, London, UK.

Ball K, Crawford D, Salmon J, Timperio A. (2004, June). Environmental influences on physical activity and nutrition behaviours – where should we look and what should we count? Invited symposium presentation, Annual Meeting of the International Society for Behavioural Nutrition and Physical Activity, Washington DC, USA.