Associations between indicators of energy intake and expenditure with excess weight and obesity among women in sedentary and less-sedentary jobs.

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ABSTRACT

The aim of this study was to compare the associations between indicators of energy intake and expenditure with excess weight and obesity in women who work full-time in sedentary and less sedentary jobs.

Data were from 3,444 participants the Australian Longitudinal Study on Women's Health, who reported their weight, dietary intake, physical activity and occupation in 2009 (baseline), and weight in 2012 (follow-up). Participants were categorised as being in a 'less sedentary' or 'sedentary' job, based on occupational activity patterns. Odds of excess weight (BMI≥25) at baseline and of being obese (BMI≥30) at follow-up, by indicators of energy intake and expenditure, were compared in the two occupational groups.

In multivariate analyses, high non-work sitting time and saturated fat intake were associated with increased odds of obesity at 3-year follow-up in both occupational groups. In the sedentary job group, high physical activity (in leisure and transport) was associated with a 51% reduction in odds of obesity (OR 0.49, 95%CI 0.25-0.97). In the less-sedentary job group, energy intake and high soft drink consumption were associated with markedly increased odds of obesity (OR 1.67 95%CI 1.07-2.61; OR 2.08 95%CI1.42-3.05, respectively).

In this cohort of young Australian women, sedentariness at work did not markedly affect the prevalence of excess weight or obesity. Indicators of high energy intake and low energy expenditure were associated with increased odds of both excess weight and obesity, regardless of sedentariness of occupational group.

Keywords: energy balance; sedentary work; physical activity; obesity; Dietary Questionnaire for Epidemiological Studies; sugar sweetened beverages; saturated fat

Introduction

Obesity is a risk factor for non-communicable diseases, which are leading causes of death in Australia and most countries throughout the world (1). Data from the Australian Longitudinal Study on Women's Health (ALSWH), show the odds for weight maintenance over 16 years vary across different occupations (2). These findings and those from studies of occupational sitting time (3) suggest that job characteristics and occupational activity might play a role in weight gain, obesity and energy balance. Investigating these factors could help to identify 'at risk' groups, to inform health promotion initiatives and policy development.

Recent analyses of Australian data have shown that factors associated with weight gain include behaviours related to energy balance (i.e. inactivity, sitting time, diet), as well as occupation and working hours (2-4). Reductions in energy expenditure at work and increases in energy intake, have been described as the major contributors to weight gain and obesity prevalence in the US (5, 6).

Little is known however about relationships between movement patterns at work and excess weight, especially in women. Studies of occupational activity and excess weight have reported conflicting results in women and often do not account for other energy balance factors like diet and energy intake (7-9). This reflects the complex interplay between energy intake and expenditure at work and during leisure time, which is further influenced by important sociodemographic factors. Overall, people tend to compensate for high occupational activity with low leisure time physical activity, whereas people with more sedentary jobs are more likely to be active during leisure time (10).

Moreover, people with lower education, which is also an important correlate of physical inactivity, unhealthy diet and obesity (11-13) are more likely to have less sedentary jobs, such as in the sales and manufacturing sectors. In contrast, those in managerial and administrative positions tend to have more sedentary occupations, but are more likely to have access to leisure time physical activity and healthy diet, as a result of their higher education and socioeconomic position (11-13). This might explain why occupational sitting time has been associated with weight status (3), but this association is unclear for women, and results from different studies vary. For example, findings from large US surveys show the highest prevalence of inactivity and obesity in relatively active occupations (forestry, fishing, farming) (14), but one large US longitudinal study has reported higher BMI in people whose work involves longer occupational sitting (8).

The aims of this study were to compare associations between indicators of energy intake and expenditure and energy intake with excess weight and obesity in women who are in sedentary and less sedentary jobs.

Methods

The Australian Longitudinal Study on Women's Health (ALSWH) is a prospective cohort study of factors related to the health and well-being of four cohorts of Australian women. The women were randomly selected from the national health insurance database, which includes all Australian citizens and permanent residents (15). Methodological details of the ALSWH are provided in previous publications and can be found at www.alswh.org.au. Women who gave written informed consent completed surveys at approximately 3-year intervals from 1996 to 2012. The current study focuses on participants in the 1973-78 cohort, with analyses of data from the 2009 (baseline, age 31-36y) and 2012 (follow-up age 34-39y) surveys. These surveys were chosen because they included the same questions on demographic characteristics, occupation, physical activity, and sedentary behaviour. Dietary intake was only assessed at baseline. Data were included in the analyses if participants reported working full time (>35h/week) at baseline (for cross-sectional analyses) and in both baseline and follow-up surveys for the prospective analyses. The study was approved by the University of Newcastle (ref: H0760795) and the University of Queensland (ref: 2004000224) Ethics Committees, Australia.

Categorisation of occupational groups

Participants were asked to report their occupational category (from the Australian Standard Classification of Occupations, ASCO) [10] at every survey. They also reported how often their work involved sitting, walking and heavy duty ('all of the time', 'most of the time', 'some of the time', 'a little of the time', 'none of the time') in the 2006 survey. The answers to the 2006 questions were used to classify each ASCO category as: a) *sedentary job* (reported all/most of time sitting, little/none walking or heavy duty, e.g. ASCO 'managers' and 'administrators'); b) *less sedentary job* (less sitting than sedentary job, some/little walking, little/sometimes heavy duty, e.g. ASCO 'professionals' and 'sales workers'); or c) *active job* (little/no sitting, all/most of time walking or heavy duty, e.g. ASCO 'labourer' or 'tradesperson'). At baseline, the reported ASCO occupational category was used to classify participants into the sedentary, less sedentary and active job categories described above. Details are described in Additional File - Table A1. As the 'active job' category included only 144 women, we were only able to compare data from women in the 'sedentary' and 'less sedentary' job categories.

Indicators of energy intake and expenditure: dietary intake, physical activity, sitting time

Energy intake and expenditure variables were measured at baseline when participants were 31-36 years. The survey and data collection methods for these variables can be accessed online (15). Dietary intake was measured using the Dietary Questionnaire for Epidemiological Studies (DQES) Version 2 (16), which uses the Australian NUTTAB 1995 food composition database. This food frequency questionnaire, which has been previously validated in this cohort, was used to assess usual consumption of 80 foods and beverages over the preceding 12 months using a 10-point frequency scale (17). This tool provided estimates of total energy intake (kJ/day, converted to kcal/day), saturated fat intake (g/day), and sugar intake (g/day). Data from questions about weekly consumption of non-diet soft drinks, carbonated and non-carbonated drinks, and fruit juice were used to quantify sugar-sweetened beverage (SSB) intake (serves/week). Data from 43 participants (1.3%) were excluded because total energy intake was outside plausible daily energy intake values (between 500-3500kcal/day), as recommended in the literature (18).

The ALSWH surveys use a validated modified version of the Active Australia survey to ask about frequency and time spent in a list of activities: walking briskly (for recreation and transport), moderate leisure activities (i.e. social tennis, dancing), and vigorous leisure activities (i.e. running, competitive sport). Time spent in each activity (minutes/week) was multiplied by a metabolic equivalent (MET) score based on average intensity: 3.33 for walking and moderate leisure-time activities, and 6.66 for vigorous leisure-time activities (19). MET.min/week for each activity were summed and participants were categorised as: 'very low' (<33.3 MET.min/week), 'low' (33.3 -<500 MET.min/week), 'moderate' (500-<1000MET.min/week) or 'high' (>1000 MET.min/week) PA (transport and leisure time physical activity) (20, 21). For the cross-sectional analyses, women were classified as 'inactive' (<500 MET.min/week) or 'active' (≥500 MET.min/week), in line with the Australian Guidelines for Physical Activity (19). Participants reported their sitting time in different domains (transport, at work, television viewing, computer use, and other activities) on work and non-work days, using a validated questionnaire (22). Because most sitting time on workdays is accounted for by sitting at work (or in transport to and from work), we used the sum of time spent sitting in all domains on non-work days as an indicator of non-work time sitting in our analyses

Outcome variables

Participants reported their weight and height in 2009 (baseline) and 2012 (follow-up). Body-mass Index (BMI) was calculated as weight (kg) divided by height squared in meters, as per WHO guidelines (23). 'Excess weight' was defined as BMI ≥25 $kg.m^{-2}$, and 'obese' as ≥30 $kg.m^{-2}$.

Covariates

The covariates included in the adjusted models were chosen based on previous analyses of data from this cohort, which showed that women without children and with higher levels of education were less likely to gain weight (2, 24), and that smoking status was associated with lower odds of maintaining a healthy BMI (<25) (2). After checking for significant associations with both the dependent variables, education, income, work hours, number of children, and smoking were included in all adjusted models; covariates were entered into the models all at once.

The covariate data were taken from the baseline survey. Participants reported their highest level of completed education, classified as: no qualification or Year 10 and lower; Year 12 or apprenticeship, Certificate/Diploma; University or higher. Income was assessed by self-report of weekly household income, classified in quartiles ranging from up to AUD$26,999/y (lowest quartile) to ≥AUD$130,000/y (highest quartile). Participants reported their weekly working hours as 35-40, 40-49, or >49 h/week. Number of children was a self-reported continuous variable, while pregnancy status was a dichotomous variable (answered yes/no to the statement *'I am pregnant now/have recently had a baby*'). Smoking status was categorised as 'never smoked', 'ex-smoker', or 'smoker' (irregular, weekly and daily smoker).

Statistical analysis

To explore the relationships between indicators of energy intake (total energy intake, saturated fat intake, sugar intake and SSB intake) and energy expenditure (sitting time and PA) with excess weight and obesity in the sedentary and less sedentary job groups, analyses were performed in four steps. First, age, weight and indicators of energy intake/expenditure and sociodemographic characteristics (education, marital status, number of children) at baseline were described according to occupational group using means, medians and proportions. Differences between the sedentary and less sedentary occupational groups were assessed using independent Student t-tests and Chi-square tests for equal proportions.

Second, women in each occupational group were classified as low/high energy intake (based on the sample's 75^{th} percentile of 7580kJ=1811.7 kcal/day) and as active/inactive

(≥500 or <500 MET.min/week), and one-way analysis of variance was used to compare weight and indicators of energy intake (EI) and energy expenditure across the eight EI/activity/occupation groups.

Third, logistic regression models were used to calculate the adjusted odds ratios for excess weight at baseline by combined EI/activity categories in the two occupational groups (less sedentary job/sedentary job). The referent category was low EI/active in a less sedentary job, and analyses were adjusted for education, income, working hours, number of children, and smoking.

Fourth, we used crude and adjusted logistic regression models to compare the associations between each dietary [energy intake (kcal/day); saturated fat intake (g/day); sugar intake (g/day); SSB consumption (serves/week)], and activity [(PA (MET.min/week); non-work sitting time (minutes/day)] variable at baseline, and odds of obesity (≥30 BMI) at follow-up, in each occupational group. Indicators of energy and nutrient intake from the DQES were categorised in tertiles. Adjusted models included participants' education, income, working hours, smoking, and number of children. For the regression analyses, data were weighted to approximate the sample distribution to the population distribution in terms of sociodemographic characteristics This was done because, when the cohort was established, women from rural and remote areas were sampled at twice the rate of women in urban areas, in order to capture the heterogeneity of health experiences of women living outside metropolitan areas (15).Data from women who were pregnant or recently pregnant at baseline were excluded.

In a supplementary analysis, Poisson regression was used to examine the risk of becoming obese at follow-up. Analyses were conducted using Stata version 12.

Results

From the 14,247 participants included in the original cohort in 1996, 8199 and 8009 women responded to the surveys when they were aged 31-36 years (2009, baseline) and 34-39 years (2012, follow-up), respectively. More than 75% (n=6,329) of the women were employed at baseline. Of these, 54% (n=3,444) were full-time workers whose data were included in the analyses. Differences between the analytical sample and excluded participants are shown in Additional file 1 - Table A2. There were no significant differences in terms of average age, but those excluded had lower income and education, and were more likely to be married and have children, than those in the analytical sample.

Participants' characteristics, grouped by 'less sedentary job' (i.e. intermediate clerical/productions, sales and service workers, professionals); and 'sedentary job' (i.e. managers, administrators, advanced clerical workers) are shown in Table 1. The majority of participants (58%) were employed in the 'less sedentary job' category. In this group, total energy intake, sugar intake and level of education were higher than in the 'sedentary job' group, which included a higher proportion of partnered (married/de facto) women. Although the differences in dietary markers were statistically significant, they were small. Smoking, PA and workday sitting time were higher in the 'sedentary job' category than in the 'less sedentary job" category. The proportions of women with excess weight and obesity were similar in each group.

Table 1 near here

Mean (or median) values for weight and indicators of energy intake and expenditure at baseline are presented in Table 2, by combined category of EI/activity in each occupational group. Mean weight was lowest in the less sedentary job/low EI/active/ group (69.1kg) and highest in the high EI/inactive/less sedentary job group (79.0kg). In both occupational groups, women with the highest excess weight were in the high EI/inactive category; they had higher saturated fat intake and drank more sugar sweetened beverages (SSB) than women in the other EI/activity categories. Sugar intake was similar in both occupational groups but (not surprisingly) higher in high EI sub-groups, with a difference of about ~40g/day between women with low and high EI. Non-work sitting was highest in the less sedentary job group with high EI, regardless of activity status.

Table 2 near here

Associations between energy intake/activity and excess weight in the two occupational groups.

Odds ratios (OR) for excess weight (BMI≥25) at baseline are shown for the combined EI/activity variable in each occupational group in Figure 1. Compared with the low EI/active women in less sedentary jobs (reference), those in the 'high EI/inactive' categories in both occupational groups were about twice as likely to have excess weight, (less sedentary job: OR 2.09 95%CI 1.36-3.20; sedentary job: OR 1.85 95%CI 1.15-2.98). Compared with the inactive women, those in the active category (>500 MET.min/week) had lower odds of excess weight (BMI≥25) in both the low and high energy intake groups, in both occupational groups.

Figure 1 near here

Overall, the baseline data showed no associations between job category and weight status. Compared with being in the 'less sedentary job' category, being in a 'sedentary job' per se did not increase the odds for excess weight (OR for BMI≥25 1.17 (95%CI 0.96-1.42).

Associations between indicators of energy intake and expenditure with odds of being obese at follow-up.

Associations between baseline indicators of energy intake and energy expenditure with odds of being obese (BMI≥30) three years later, in each of the two occupational groups, are shown in Table 3. The prevalence of obesity at follow-up was 22.3% in the less sedentary job group (2.7% increase over 3 years) and 22.7% in the sedentary group (0.6% increase). The odds of being obese in a sedentary job (compared with a less-sedentary job) was 1.15 (95%CI 0.92-1.46). In univariate analyses, all the variables except sugar intake were associated with obesity at follow-up. In adjusted models, the strongest predictors of obesity were non-workday sitting time and saturated fat intake in both occupational groups; SSBs and total energy intake were also associated with obesity in women in the less sedentary job group. Although there was an inverse dose-response relationship between PA and odds of being obese in both occupational groups, the only significant association was for high PA in the sedentary job group. Compared with being inactive, being highly active was associated with a ~50% reduction in odds of obesity in this occupational group (OR 0.49, 95%CI 0.25-0.97). The sensitivity analysis showed that the only factor associated with incidence of obesity was high SSB intake in the 'less sedentary' job group (IRR 2.04, 95%CI 1.09-3.80 -Table A3, Appendix)

DISCUSSION

In this cohort of young Australian women, being in a sedentary job did not seem to be a major contributor to the prevalence of excess weight or obesity. Indicators of high energy intake and low energy expenditure were associated with increased odds of both excess weight at baseline and obesity at follow-up, regardless of sedentariness of occupational group.

The main finding from this study is that high PA and low total energy intake were more strongly associated with current excess weight and future obesity, than sedentariness at work. In line with this, data from a US national cohort study also show no association between higher sedentariness at work and BMI, but an inverse association between moderate-to-vigorous physical activity (MVPA) and BMI in women (8). However, US researchers have reported that occupation has a strong influence on sitting and may influence physical activity and weight gain (9), and that a 5-decade reduction in energy expenditure at work (METs) was associated with increased weight in men and women (26). Danish researchers have also reported that higher occupational sitting time is associated with increases in BMI in women, but not in men (25). It is difficult to compare our findings with those of others, because measures of occupation vary widely, and each study has included different age ranges. None of the previous studies has measured or included energy intake or dietary factors in their analyses (8,9,25,26).

We observed that high energy intake was underpinned by high intake of saturated fat and SSBs. Not surprisingly, these were associated with both excess weight (≥25 BMI) and obesity (≥30 BMI). High intake of these foods in our sample might reflect the inclusion of full-time working women, who may experience time pressure, in terms of balancing paid work and family demands (27,28). Time pressure and stress are known drivers of convenience food choices, which are often energy dense, high-fat and high-sugar foods (i.e. SSBs, chocolate, fast-food) (29-31). Previous studies have shown lack of time and job stress are barriers to healthy eating (31-33), further highlighting the complexity and difficulty of maintaining healthy lifestyle when job and life demands are high. Measuring these factors in future studies of occupational activity could help clarify these complex associations, as well as gender differences in weight and health outcomes.

The current study has many strengths, including the large sample size, and multivariate analyses which adjusted for important confounders, yet some limitations remain. Although we included a variety of indicators of both energy intake and expenditure, we were constrained by the questions asked in this large ongoing cohort study, which does not have measures of all the potential biological and environmental contributors to eating and moving behaviours. Moreover, the surveys rely on self-reported information, which is a common limitation of epidemiological studies. However, the measures used to assess weight (34), PA (35), sitting time (22) and EI (17) in the ASLWH cohort have previously been shown to have acceptable validity for use in large epidemiologic studies.

As self-reported data are subject to reporting bias, and may not be normally distributed, we used adjusted variables based on validated cut-points for both diet (18) and physical activity (19, 20). We also provided a clear rationale for categorisation into sedentary and less sedentary occupational groups, based on self-reported activity patterns at work. Use of categorical variables helps to overcome any systematic biases, such as the potential under-estimation of energy intake in self-reported dietary measures (36). We therefore used tertiles to compare women in the lowest and highest categories of the dietary outcomes studied. Categorisation of dietary data with the DQES used in this study shows good agreement with estimates obtained from weighed food records (36). Notwithstanding, the results should be interpreted with caution, as the measures provide estimates of exposure to different diet, physical activity, and activity patterns, based on women's perceptions of their behaviours. Studies with objective measures are required to confirm our findings. The analyses should also be repeated at a later date when there is higher incidence of obesity, so that issues of temporality and direction of causation can be clarified.

Another limitation is that the inclusion of only full-time working women, and loss to follow-up, may have resulted in an analysis sample that is not representative of all women in this age group (37). There were however only small differences between the analysis sample and the original cohort (which was representative of women in this age group at the start of the study) (37). The women whose data were included here had higher income and education and were less likely to be married with children than those who were not included, which is not surprising given that we purposely selected those in full-time work.

Finally, we were not able to include data from women in the ‘Active job’ category in our analyses, because there were too few women in active jobs in our sample to satisfy assumptions for most of the statistical tests. This observation of few women in active jobs is in line with national occupational statistics which show low prevalence of women in trades and labouring jobs. Fewer than 5% of women employed in Australia are in the ‘manufacturing, construction and warehousing’ sector (38). Future studies with women in these occupations are warranted.

Conclusions

Our analyses showed that sedentariness at work did not markedly affect the prevalence of excess weight or obesity in either cross-sectional or prospective models. Regardless of occupation, sitting time on non-workdays, and high saturated fat intake were strongly associated with obesity in both occupational groups. We found that high levels of non-occupational physical activity may be especially important for obesity prevention among women in sedentary jobs, and that reductions in energy and soft drink intake may merit more attention among women in less-sedentary jobs.

Data statement

The data used in this study are from the Australian Longitudinal Study on Women's Health. Restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available free of charge from the Australian Longitudinal Study on Women's Health, following submissions of an expression of interest form, and approval by the Data Access Committee. Further information can be found at https://www.alswh.org.au/how-to-access-the-data/alswh-data or requested at alswh@uq.edu.au - Data Access and Liaison Officer.

Competing interests

Authors declare they have no competing interests

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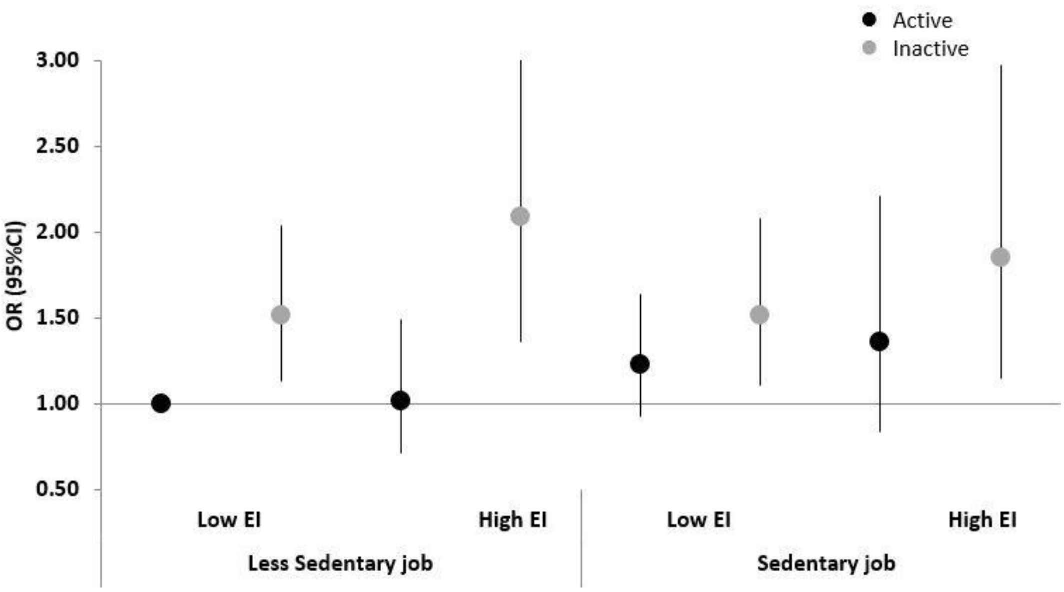

Figure 1 – Adjusted odds ratios for excess weight (BMI≥25) by physical activity levels (active/inactive) and energy intake (low/high EI) in two occupational groups (less sedentary job/sedentary job). Model adjusted for education, income, working hours, number of children, and smoking. N= 2,748; baseline data.

Table 1 – Behavioural and demographic characteristics of women in two occupational groups at baseline (n= 3300 full-time working women).

Variable	Less sedentary job n=1903	Sedentary job n=1397	p-value
Age years; mean, (SD)	33.5 (1.5)	33.6 (1.5)	0.983
Weight kg; mean, (CI)	71.2 (70.4-72.0)	72.4 (71.4-73.5)	0.057
Excess weight (% BMI≥25)	43.4	45.9	0.139
Obese (%BMI≥30)	19.6	22.1	0.084
Energy intake	1522.9	1481.0	0.021
kcal/day, mean (CI)	1492.7- 1546.7	1452.0- 1507.0	
Sugar intake g/day; mean (CI)	75.4 (74.1-76.7)	71.1 (69.7-72.6)	<0.001
SSB intake serves/week; mean (SD)	3.0 (5.1)	3.1 (4.5)	0.667
Saturated Fat intake g/day mean (CI)	26.2 (25.5-26.6)	25.7 (25.2-26.4)	0.532
PA* MET.min/week; median (IQR)	675.0 (240.1-1410.2)	750.0 (299.9-1500.2)	0.0481
Sitting time			
Work day min/day; mean (SD)	570.0 (256.5)	655.0 (214.3)	<0.001
%High sitting (>8h/day)	64.1	82.8	0.001
Non-work day min/day; mean (SD)	556.0 (284.8)	562.5 (292.1)	0.532
%High sitting (>8h/day)	59.8	59.2	0.746
Education (%)			
No qualification or Year 10	3.9	4.5	<0.001
Year 12 or apprenticeship	8.1	16.7	
Certificate/Diploma	14.3	31.8	
University or higher	73.7	47.6	
Income (%)			
25^{th}	30.6	29.3	0. 202
50^{th}	36.9	38.3	
75^{th}	32.5	32.4	
Married/de facto yes %	62.1	67.2	0.014
Number of children (%)			
0	70.5	67.5	0.160
1-2	24.7	27.4	
3+	4.9	5.1	
Hours worked/week (%)			
35-40h	47.6	42.9	0.024
40-49h	30.3	33.6	
+49h	22.1	23.6	
Smoking (%)			
Current	15.0	20.8	<0.001
Never	64.9	53.2	
Ex-smoker	20.1	26.0	

SSB: sugar-sweetened beverages, PA: transport and leisure time physical activity, CI: 95% confidence interval, Median, IQR reported as (range Q1-Q3).

Table 2 - Weight and energy intake/expenditure indicators at baseline by energy intake (low/high) and physical activity levels (inactive/active), in the two occupational groups (mean ± standard deviation or median and IQR*)**. N=3300**

	Less sedentary job				Sedentary job				
	Low EI		*High EI*		*Low EI*		*High EI*		
	≥500MET n=847	<500MET n=555	≥500MET n=243	<500MET n=211	≥500MET n=598	<500MET n=460	≥500MET n=148	<500MET n= 157	**P-value#**
Mean weight (kg)	69.1±14.8	71.7 ±17.5	72.5±18.2	79.0±21.8	70.2±14.9	73.2± 19.0	74.5± 20.9	76.8±20.5	<0.001
Excess weight *(% BMI≥25)*	38.1	49.43	40.67	56.69	41.7	49.21	43.41	55.17	<0.001
Energy intake *(kcal/day)*	1272.1±286.4	1264.8±308.1	2240.2±385.5	2308.9±386.6	1253.7±298.5	1279.6±305.6	2174.4±329.3	2223.5±351.3	<0.001
Sugar intake (g/day)	66.6±21.8	61.8±20.2	104.6±27.6	101.5±31.8	63.7±21.8	60.4±20.5	98.9±28.0	97.3±27.6	<0.001
Sat fat (g/day)	20.4±6.6	22.0±7.6	39.7±10.5	42.2±10.6	20.8±7.2	22.4±7.0	38.8±9.5	41.5±10.8	<0.001
SSB drinks*/week**	2.3±4.2 0.8 (0.5-1.8)	3.2±5.6 0.8 (0.5-3.8)	3.8±6.1 1.0 (0.5-4)	4.4±6.0 1.5 (0.5-5.5)	2.6±4.0 0.75 (0.5-3.5)	3.0±4.8 1.3 (0.5-4.0)	3.6±5.0 1.3 (0.5-4.0)	4.5±4.9 1.3 (0.5-4.0)	<0.001
MVPA (MET.min/week)*	1618.3 (799.2-1931.1)	212.7(0-399.6)	1503.5 (799.2-1748.25)	196.4 (0-366.3)	1480.6(799.2-1798.2)	211.1(49.9-399.6)	1806.7 (799.2-2197.8)	211.7(49.9-399.6)	<0.001
Non-workday sitting (min/day)	539.9 ± 272.3	540.6±285.9	612.2±304.6	598.5±281.2	551.8±277.9	583.7±340.0	560.0±302.2	557.7±262.9	0.026

SSB: sugar-sweetened beverages; MVPA: moderate-to-vigorous physical activity.
* median and IQR reported as (range Q1-Q3) for those variables not normally distributed
# P values from analysis of variance across the eight EI/activity/occupation groups.

Table 3 – Odds ratios (and 95% CIs) for being obese (BMI≥30) at 3-year follow-up, based on baseline predictors.

	OR for being obese (95%CI)			
	Less sedentary job n=1203		**Sedentary job** n=909	
	Crude	**Adjusted***	**Crude**	**Adjusted***
PA levels#				
Very Low	*Reference*	*Reference*	*Reference*	*Reference*
Low	0.82 (0.52-1.30)	0.85 (0.50-1.45)	0.76 (0.44-1.31)	0.83 (0.43-1.56)
Moderate	0.60 (0.37-0.97)	0.66 (0.37-1.15)	0.62 (0.34-1.10)	0.63 (0.32-1.28)
High	0.57 (0.36-0.89)	0.63 (0.35-1.09)	0.51 (0.29-0.88)	0.49 (0.25-0.97)
Non-work sitting time (min/day)				
Low,<480	*Reference*	*Reference*	*Reference*	*Reference*
High ≥480	2.04 (1.50-2.77)	2.20 (1.53-3.15)	2.24 (1.58-3.18)	2.75 (1.83-4.13)
Energy intake (kcal/day)				
<1150	*Reference*	*Reference*	*Reference*	*Reference*
1150-1625	1.24 (0.85-1.80)	1.26 (0.82-1.96)	1.09 (0.71-1.65)	1.11 (0.67-1.82)
>1625	1.64 (1.13-2.38)	1.67 (1.07-2.61)	1.37 (0.89-2.11)	1.26 (0.76-2.10)
Sat. Fat intake (g/day)				
<25	*Reference*	*Reference*	*Reference*	*Reference*
25-35	1.14 (0.81-1.60)	1.07 (0.72-1.61)	1.23 (0.84-1.83)	1.16 (0.75-1.81)
>35	1.86 (1.30-2.67)	2.45 (1.60-3.76)	2.11 (1.38-3.21)	1.89 (1.15-3.09)
Sugar intake (g/day)				
<70	*Reference*	*Reference*	*Reference*	*Reference*
70-90	0.88 (0.62-1.24)	0.91 (0.61-1.37)	1.02 (0.69-1.51)	0.87 (0.57-1.36)
>90	0.99 (0.70-1.40)	1.01 (0.68-1.50)	1.19 (0.79-1.81)	1.13 (0.70-1.81)
SSB intake (serves/week)				
<1	*Reference*	*Reference*	*Reference*	*Reference*
1-3	1.81 (1.24-2.67)	1.68 (1.07-2.67)	1.15 (0.74-1.79)	1.23 (0.74-2.05)
>3	2.29 (1.66-3.18)	2.08 (1.42-3.05)	1.49 (1.03-2.15)	1.43 (0.94-2.21)

#PA: transport and leisure time physical activity, categories based on MET.min/week as per (21); SSB: sugar-sweetened beverages. * Adjusted for education, income, number of children, smoking, and work hours. Data from women who were pregnant/recently pregnant at follow-up (2012) were excluded