ScotPHO
Public Health Information for Scotland

Are People in Scotland Becoming More Active?

Combined Results from Scotland's Routine National Surveys

Supplementary Analysis of Trends in Inactivity (1995–2006)

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SCOTTISH GOVERNMENT

NHS
Health Scotland

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Scottish Public Health Observatory (ScotPHO) collaboration

The Public Health Observatory Division at NHS Health Scotland is part of the ScotPHO collaboration. Led by NHS Health Scotland and ISD Scotland, the collaboration brings together key national organisations in public health intelligence in Scotland. We are working closely together to ensure that the public health community has easy access to clear and relevant information and statistics to support decision making. For further information, please see the ScotPHO website at www.scotpho.org.uk

Contents

Summary

Physical inactivity presents a considerable health risk to people in Scotland. This study employed multiple logistic regression analysis of triangulated data from two of Scotland's routine national surveys (the Scottish Health Survey and the Health Education Population Survey) to examine trends in inactivity over time, from 1995 to 2006. The results suggest that there has been a slight reduction in the proportion of inactive women (aged 16-64) over that period. They also suggest a modest reduction in the proportion of inactive men (aged 16-64), but only until 2003. It is not possible to draw robust conclusions about more recent trends in male inactivity until results from the 2008 SHeS become available. These results are consistent with evidence of a modest increase in compliance with the physical activity recommendations, as described in the main report[1] to which this paper is intended as a supplement.

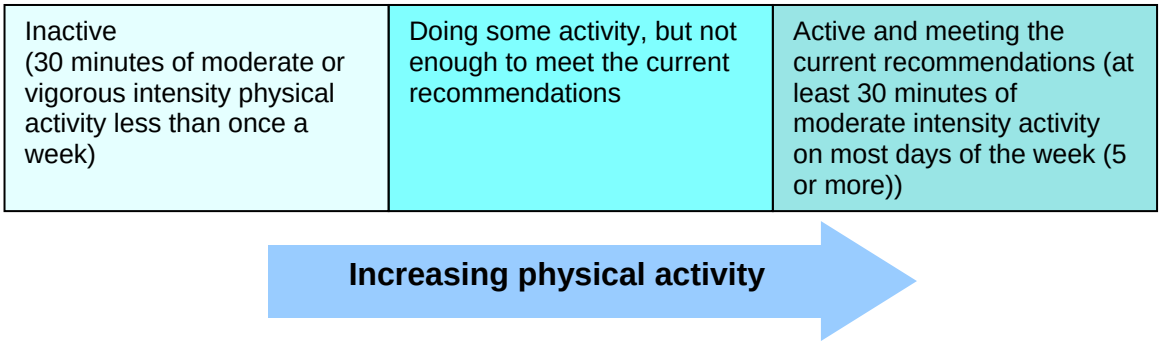
Introduction

Background

People who are physically inactive are at increased risk of many health problems, including coronary heart disease, certain cancers, diabetes, obesity, osteoporosis, disability and poor mental health. The report *Are people in Scotland becoming more active? Combined results from Scotland's routine national surveys*, published by NHS Health Scotland in 2009,[1] examines trends over time in the proportion of adults in Scotland meeting the current recommendations for physical activity between 1995 and 2006. Early findings from this work were presented to the *Let's Make Scotland More Active*[2] (LMSMA) Review Group, the members of which expressed an interest in the same analysis being undertaken for trends in *inactivity* over time. This paper presents the results of those supplementary analyses. It is intended to be read along with the main report and not as a stand alone publication.

The main report and this supplementary paper look at opposite ends of the physical activity spectrum, as illustrated in Figure 1. Together these analyses provide some insight into whether changes in the proportion meeting the recommendations reflect a shift across the whole physical activity spectrum or result solely from people who are already physically active becoming more so.

Figure 1 Physical activity levels amongst people in Scotland



This supplementary analysis focuses on people who do very little physical activity or none at all, and classifies people in this category as inactive.

Aim

The aim of this supplementary paper is to examine trends over time in inactivity (1995-2006) among adults in Scotland, and to compare these with trends in compliance with the current physical activity recommendations as described in the main report.

Methods

This study triangulated repeated cross-sectional data from the Scottish Health Survey (SHeS) and the Health Education Population Survey (HEPS), using multiple logistic regression modelling techniques to examine trends over time in inactivity. Data were included for adults aged 16-64 from all sweeps of both surveys available at the time of analysis: 1995, 1998 and 2003 from the SHeS; 1996 to 1999 and 2001 to 2006 from the HEPS. Change over time was measured across the combined time series, i.e. between 1995 and 2006. To facilitate comparison with the main report, the inactivity analysis examined trends in men and women separately.

The outcome variable for inactivity was created using the standard derived variables for physical activity in each of the survey datasets. The SHeS classified respondents as active if they did 30 minutes or more of moderate or vigorous intensity physical activity at least once a week; those doing less than this were classified as inactive. The HEPS classified individuals as active if they did 30 minutes or more of moderate intensity activity at least once a week or if they did 20 minutes or more of vigorous intensity activity at least once a week, with all others considered to be inactive.

Multiple logistic regression analysis was used to examine trends over time following the same modelling strategy used in the main report. The regression model used unweighted data, incorporated the same five explanatory variables (gender, age, deprivation, survey, and time) and used the same reference groups for categorical variables. Please refer to the main report for full details. All statistical analysis was undertaken using SPSS Version 17.0. Results have been described as statistically significant where $P<0.05$.

Regression analysis gives information about trends and effects in relative terms only. To give a sense of absolute levels of inactivity, the weighted survey estimates are presented alongside the modelled results.

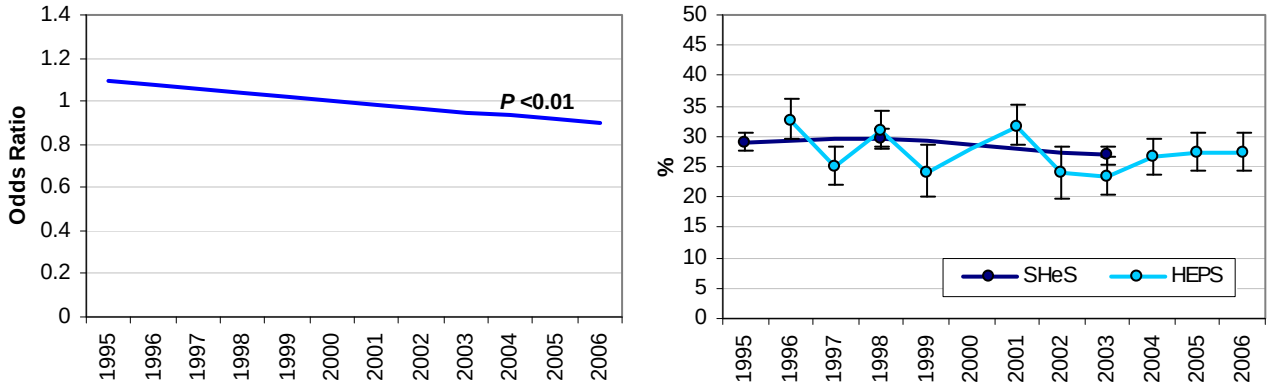
Results

Men

Data for a total of 15,240 respondents (5,595 from the HEPS and 9,645 from the SHeS) were included in the regression model for men.[i] For full results, see Appendix Table 1. Year was significant in the final model (OR 0.98, 95% confidence interval (CI) 0.97 to 0.99, *P*<0.01), indicating a slight reduction in the prevalence of inactivity between 1995 and 2006, consistent across men of all ages and deprivation quintiles (Figure 2i). The corresponding weighted estimates are provided in Figure 2ii.

Figure 2 Inactivity in men aged 16-64 over time (1995-2006)

(i) Modelled results: HEPS & SHeS combined (ii) Weighted survey estimates



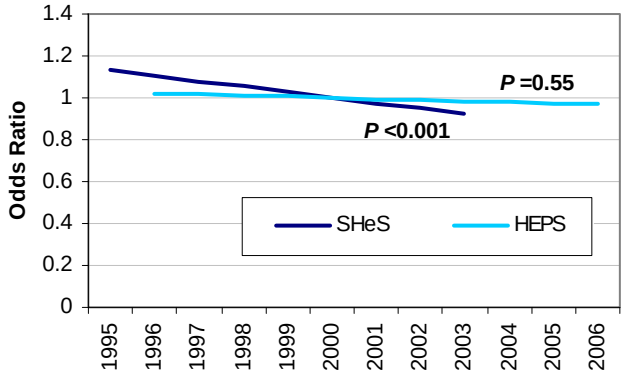
Age and survey were also significant. Compared with 16-24 year olds, men aged 35 and above had higher odds of being inactive, while SHeS respondents were more likely to be identified as inactive compared with those taking part in the HEPS. Deprivation quintile was not significant in the model on its own, but significant interactions with age and survey indicate that the effects of age and survey vary by deprivation.

Weak evidence (*P*=0.07) of an interaction between year and survey suggested that inactivity trends over time may differ between the two surveys. As a significant survey effect was observed in the main report for compliance with the recommendations, we therefore modelled the inactivity data from each survey separately (Appendix Table 2). Results from the SHeS suggest that there has been a small decrease in inactivity levels over time (OR 0.98, 95% CI 0.96 to 0.99, *P*<0.001), but no significant change was observed for the HEPS (OR 0.99, 95% CI 0.98 to 1.01, *P*=0.55) [Figure 3i (for comparison, the corresponding figure for compliance with the recommendations is reproduced from the main report in Figure 3ii)]. These findings show that the effect in the SHeS is sufficiently strong to generate a significant effect when the data from both surveys are combined (Figure 2i).

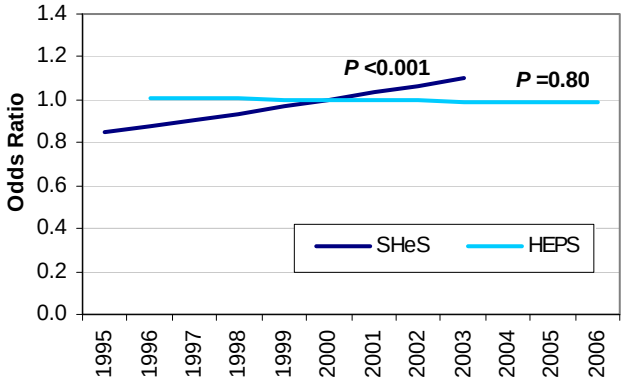
[i] Outcome variables for the main report (proportion meeting recommendations) and this supplementary paper (proportion inactive) were based upon slightly different standard derived variables in the original survey datasets, resulting in minor differences in the numbers included in each analysis.

Figure 3 Modelled results for male (16-64 years) trend over time (1995-2006), modelled separately for the SHeS and HEPS (unweighted data)

(i) Inactivity



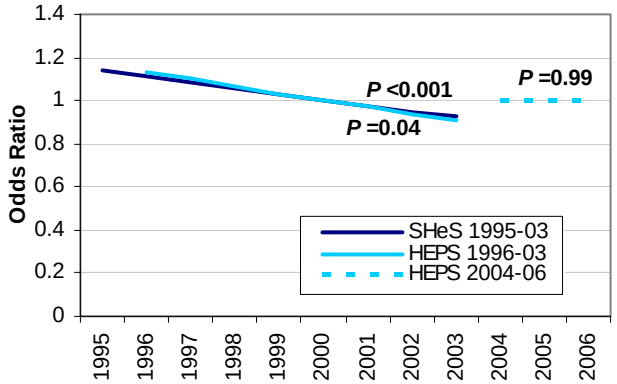
(ii) Meeting the recommendations



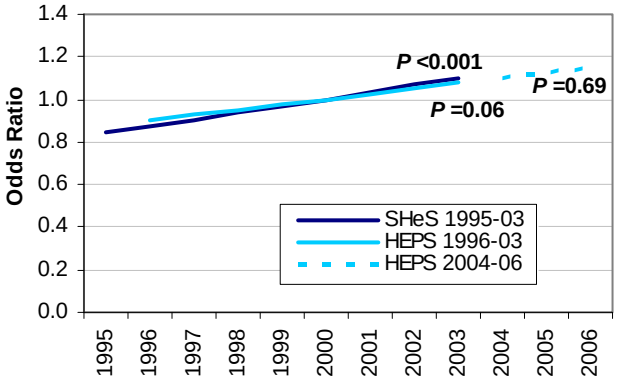
Observation of the weighted estimates (Figure 2ii) and results from the main report suggest the possibility of two distinct trends in inactivity over the HEPS series: an initial reduction followed by more recent stability. To test this hypothesis, HEPS data were modelled separately for 1996-2003 and for 2004-2006 (Appendix Table 3). The results show a significant decrease in the prevalence of inactivity between 1996 and 2003 (OR 0.97, 95% CI 0.94 to 0.998, *P*=0.04) with no significant change thereafter (2004-2006: OR = 1.00, 95% CI 0.88 to 1.14, *P*=0.99) (Figure 4i). These findings match those from the corresponding analysis in the main report, which show an initial rise in compliance with the recommendations (1996-2003) with no significant change more recently (2004-2006) (Figure 4ii). Results from the SHeS are shown on both graphs for comparison.

Figure 4 Modelled results for male (16-64 years) trend over time, HEPS data modelled separately for 1996-2003 and 2004-2006 (unweighted data)

(i) Inactivity



(ii) Meeting the recommendations

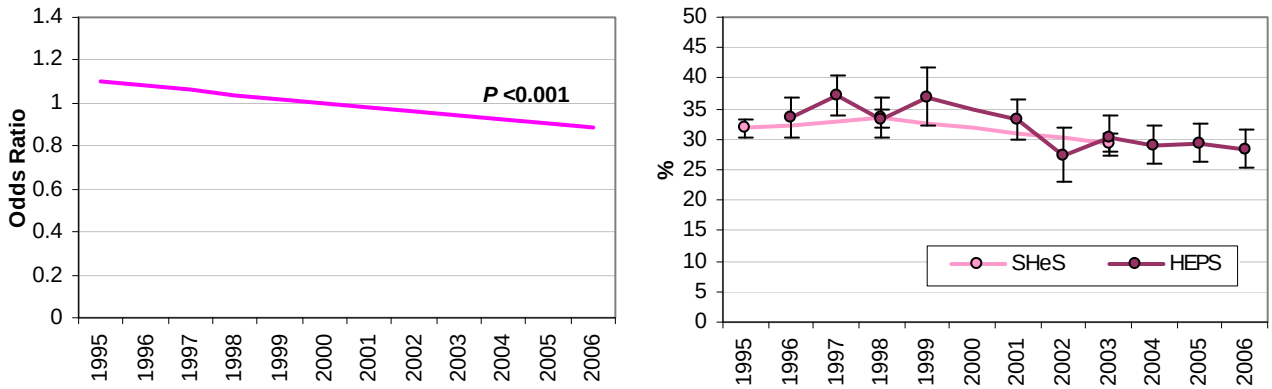


Women

Data for a total of 19,569 respondents (7,493 from the HEPS and 12,076 from the SHeS) were included in the regression model for women.[ii] For full results, see Appendix Table 4. Year was significant in the final model (OR 0.98, 95% CI 0.97, 0.99, *P*<0.001), indicating a slight reduction in the prevalence of inactivity amongst women from 1995 to 2006 (Figure 5i). There were no significant interactions between year and any other variable in the model, demonstrating that this finding is consistent across women of all age groups, deprivation quintiles and in both surveys. The corresponding weighted estimates are shown for reference (Figure 5ii).

Figure 5 Inactivity in women inactive men aged 16-64 over time (1995-2006)

(i) Modelled results: HEPS & SHeS combined (ii) Weighted survey estimates



As for men, age and survey were also significant in the model, indicating that each has an independent effect upon women's odds of being inactive. Compared with 16-24 year olds, women aged 45 and above had higher odds of being inactive, while SHeS respondents were more likely to be identified as inactive compared with those taking part in the HEPS. Deprivation quintile was also significant in the model, but a significant interaction with age group shows that the effects of deprivation upon a woman's odds of inactivity vary by age. There was also a significant interaction between age group and survey indicating that the survey effect varies by age.

Discussion

Are people in Scotland becoming more active? Combined results from Scotland's routine national surveys describes trends in compliance with the recommendations for physical activity between 1995 and 2006. This supplementary paper examined trends in physical *inactivity* over the same time period in the same target group (adults aged 16-64). It is intended to be read along with the main report and not as a stand alone publication.

[ii] Outcome variables for the main report (proportion meeting recommendations) and this supplementary paper (proportion inactive) were based upon slightly different standard derived variables in the original survey datasets, resulting in minor differences in the numbers included in each analysis.

Initial results for men, based upon combined data from the SHeS and HEPS, suggested a significant decrease in the prevalence of inactivity between 1995 and 2006. However, further exploration revealed a significant effect over each survey's full time series - 1995-2003 for the SHeS and 1996-2006 for the HEPS - for the SHeS alone. The combined result was observed because the SHeS effect was sufficiently strong to generate a significant effect overall.

The results of analysing data from each survey separately provide strong evidence of a modest, but significant, decrease in the proportion of inactive men from the mid-1990s when each survey began (1995 for the SHeS and 1996 for the HEPS) to 2003. Weighted estimates from the SHeS show similar levels of inactivity in 1995 and 1998 (29% and 30% respectively), followed by a modest decrease to 27% in 2003. Weighted estimates from the HEPS time series ranged from 33% in 1996 to 23% in 2003, but the estimates for intervening years were highly variable. Subsequent data are currently available only from the HEPS. Estimates from the 2004-2006 surveys were stable at 27%. However, the survey sample size is too small to draw robust conclusions about short term trends. More precise information about recent trends will be available from the 2008 SHeS, due to report in September 2009.

There was no evidence of a difference in female trends over time between the two surveys. Modelled results from the combined data suggest that there has been a significant reduction in the proportion of inactive women from 1995 to 2006. This finding is supported by the weighted survey estimates. Fewer women were inactive in the 2003 SHeS (29%) compared with the two previous surveys (32% in 1995 and 33% in 1998). Estimates over the HEPS time series decreased from 33% in 1996 to 28% in 2006, but were highly variable in the intervening years with the lowest estimate of 27% occurring in 2002.

These results from the inactivity analysis are consistent with those described in the main report, which demonstrate a modest increase in compliance with the physical activity recommendations over the same time period.

Physical activity levels are known to vary by age and deprivation. Multiple logistic regression analysis enabled us to examine trends in inactivity over time after adjusting for these important variables. The main report contains a full outline of the strengths and limitations associated with the methods and data used to assess compliance with the recommendations. They apply equally to the inactivity analysis and the results presented here should be considered with them in mind. In particular, the ability of the HEPS to monitor trends over time is restricted by its relatively small sample size, which is also reflected in the wide confidence intervals for the weighted estimates (see Figures 2 and 5).

Data from the 2008 SHeS (due to report on the 29th of September 2009) will provide further insight into more recent trends in inactivity amongst men and women in Scotland.

Conclusions

- The combined survey data suggest that there has been a slight reduction in the proportion of inactive women (aged 16-64) from 1995 to 2006.
- Both surveys also support a modest reduction in the proportion of inactive men (aged 16-64), but only until 2003. It is not possible to draw robust conclusions about more recent trends in male inactivity until results from the 2008 SHeS become available.
- These results are consistent with those described in the main report,[1] which demonstrate a modest increase in compliance with the physical activity recommendations over the same time period.

References

1. Catto S, Gibbs D, Mitchell R. *Are people in Scotland becoming more active? Combined results from Scotland's routine national surveys*. Glasgow: NHS Health Scotland; 2009.

2. Physical Activity Task Force. *Let's make Scotland more active: A strategy for physical activity*. Edinburgh: Scottish Executive; 2003.

Appendix Multiple logistic regression tables

Table 1 Male logistic regression model, HEPS & SHeS Combined

Predictor	**Exp(B) odds ratio**	**95% CI**		***P*-value**
		Lower	**Upper**	
Time effect (per year)	0.983	0.972	0.994	**0.002**
Age group				**<0.001**
16-24	1			
25-34	1.201	0.849	1.698	0.30
35-44	1.480	1.070	2.047	**0.02**
45-54	2.024	1.464	2.799	**<0.001**
55-64	2.936	2.131	4.045	**<0.001**
Deprivation quintile				0.49
1st-least deprived	1			
2nd	1.106	0.728	1.680	0.64
3rd	1.021	0.659	1.583	0.93
4th	1.332	0.890	1.994	0.16
5th-most deprived	1.308	0.873	1.959	0.19
Survey effect at year 2000				**0.04**
HEPS	1			
SHeS	1.205	1.011	1.437	**0.04**
Age/deprivation interaction				**0.002**
Deprivation/survey interaction				**0.002**

Table 2 Male time effects – modelled separately for the HEPS and SHeS

(a) HEPS

Predictor	Exp(B) odds ratio	95% CI		*P*-value
		Lower	Upper	
Time effect (per year)	0.995	0.977	1.012	0.55

(b) SHeS

Predictor	Exp(B) odds ratio	95% CI		*P*-value
		Lower	Upper	
Time effect (per year)	0.975	0.961	0.988	**<0.001**

Table 3 Male time effects from the HEPS – modelled separately for 1996–2003 and for 2004–2006

(a) HEPS 1996-2003

Predictor	Exp(B) odds ratio	95% CI		*P*-value
		Lower	Upper	
Time effect (per year)	0.969	0.941	0.998	**0.04**

(b) HEPS 2004-2006

Predictor	Exp(B) odds ratio	95% CI		*P*-value
		Lower	Upper	
Time effect (per year)	1.001	0.882	1.135	0.99

Table 4 Female logistic regression model, HEPS & SHeS Combined

Predictor	**Exp(B) odds ratio**	**95% CI**		***P*-value**
		Lower	**Upper**	
Time effect (per year)	0.981	0.972	0.990	**<0.001**
Age group				**<0.001**
16-24	1			
25-34	1.028	0.750	1.409	0.86
35-44	1.129	0.839	1.519	0.42
45-54	1.397	1.036	1.886	**0.03**
55-64	1.886	1.403	2.534	**<0.001**
Deprivation quintile				**0.03**
1st-least deprived	1			
2nd	0.851	0.626	1.156	0.30
3rd	0.974	0.723	1.312	0.86
4th	1.051	0.787	1.402	0.74
5th-most deprived	1.321	0.999	1.747	0.05
Survey effect at year 2000				**0.02**
HEPS	1			
SHeS	1.251	1.039	1.507	**0.02**
Age/deprivation interaction				**0.006**
Age/survey interaction				**0.004**

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