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Health Enhancing Physical Activity

Levels and differences in a Swedish sample

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ABSTRACT

Background: A large part of the global burden of disease and death today is due to non communicable diseases such as cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. The increasing prevalence of these diseases can be attributed to the related lifestyle changes such as increasing tobacco use, physical inactivity and an unhealthy diet.

Aims: To investigate levels of total health enhancing physical activity (HEPA) and HEPA in the following domains: work, transportation, household and leisure time in the Swedish adult population, as well as to investigate the differences in HEPA levels across genders, age groups, socio-economic status and BMI groups.

Methods: Information about physical activity was collected in a randomly selected group of adults in Sweden using the long format of the self administered International Physical Activity Questionnaire (IPAQ). The IPAQ included questions about the number of days and the number hours or minutes per day spent in moderate and vigorous activities in the domains work, transportation, household and leisure time as well as in walking and cycling, where intensity was also assessed. The study group consisted of 1592 subjects with a mean age of 46.5 years.

Results: The median (25^{th}-75^{th} percentile) level of total HEPA was 490 (180-1080) minutes/week. One third (33.2%) of the study group reported HEPA at work, which resulted in a median value of 0 (0-180) minutes/week. The level of HEPA for transport was 0 (0-60), with 30.5% of the study group reporting activities in this domain. The level of domestic HEPA was a median of 120 (0-360) minutes/week and 50 (0-210) minutes/week for leisure time HEPA. Men reported more total HEPA than women. The highest levels of total HEPA were reported in the 35 to 44 age group. The level of total HEPA decreased from workers to lower to middle to higher employees.

Conclusion: Covering more domains than leisure time physical activity, this study revealed higher levels of total physical activity than most other studies Most participants reported having physical activity in domestic chores and leisure time. One third reported HEPA at work, but it is difficult to change activity in this domain. Since only 30.5% of all subjects reported any HEPA during transportation, there might be a great potential for increasing HEPA in this domain by interventions

Keywords: adult, assessment, IPAQ, self reported,

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1 INTRODUCTION

A large part of the global burden of disease and death today is due to non-communicable diseases such as cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. The increasing prevalence of these diseases can be attributed to the related lifestyle changes such as increasing tobacco use, physical inactivity and an unhealthy diet. Physical activity is an important component of a healthy lifestyle and is beneficial in preventing diseases such as cardiovascular diseases, cancer, diabetes, and obesity.

Health enhancing physical activity (HEPA) is physical activity in daily life at least at moderate level. Considering the fact that total energy expenditure is derived from all activities during daily life, information about total physical activity is needed to assess the prevalence of physical activity in a population and to compare data from different populations.

This study aims to investigate levels of health enhancing physical activity (HEPA) in total and HEPA in the domains work, transportation, household and leisure time in the Swedish adult population, as well as to investigate the differences in HEPA levels across genders, age groups, socio-economic status and BMI groups.

2 BACKGROUND

2.1 Definitions

Physical Activity is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (Caspersen et al. 1985). Exercise is a subcategory of physical activity, being physical activity that is planned, structured and repetitive and with the purpose of improvement or maintenance of one or more components of physical fitness as an objective (Caspersen et al. 1985). In turn, fitness is the ability to perform muscular work satisfactorily (WHO, 1968). Fitness comprises cardio respiratory endurance, muscular strength and endurance and flexibility and is determined by several variables such as physical activity level, diet and heredity.

Metabolic equivalent (MET) is a unit used to estimate the metabolic costs i.e., oxygen consumption of physical activity. One MET equals the resting metabolic rate, approximately 3.5ml O_2 x kg^{-1}x min^{-1}. Four METs is four times the resting metabolic rate (Willmore JH, 1999).

Light-intensity physical activity is any activity requiring less than 3 METs of energy expenditure or performed at less than 50% of maximum heart rate. Moderate Activity is any activity requiring 3 to 6 METs of energy expenditure or performed at 50 to 69% of maximum heart rate. Vigorous Activity is defined as hard or very hard physical activity, requiring sustained, rhythmic movements and greater than 6 METs of energy expenditure, performed at 70% or more of maximum heart rate (Willmore JH, 1999).

Health enhancing physical activity (HEPA) is physical activity in daily life at least at moderate level. HEPA does not necessarily influence fitness. HEPA does not need to be structured exercise but can be every task in daily life like walking or cycling to work, playing with the children, household or garden work (Bouchard & Shephard, 1994). The differences between fitness related and health enhancing physical activity are displayed in table 1.

Table 1 Differences between fitness related and health enhancing physical activity

	Fitness related	Health enhancing
Intensity	>60% VO_2 max	50-75% VO_2 max
Frequency	3-5 /week	Every day
Duration	15-60 minutes	>30 minutes
Mode	Aerobic, continuous	Varied, intermittent

2.2 Burden of physical inactivity

A large part of the global burden of disease and death today is due to non communicable diseases (NCD) such as cardiovascular diseases (CVD), cancer, diabetes and chronic respiratory diseases. The increasing prevalence of these diseases can be attributed to the related lifestyle changes such as increasing tobacco use, physical inactivity and an unhealthy diet. Physical inactivity is an underlying cause of death, disease and disability (WHO, Global burden of disease, 2000). Data from the WHO risk factor study suggest that physical inactivity is one of the leading underlying causes of death and disability (WHO, WHR 2002). Physical inactivity is estimated to cause around 1.9 million deaths per year worldwide. Physical inactivity causes 10-16% of the cases of breast cancer, colon cancer, rectal cancer and diabetes as well as 22% of all cases of ischaemic heart disease (WHO, WHR 2002).

2.3 Physical activity and health correlates

2.3.1 Mortality

It has been shown that persons with a moderate or high level of physical activity have a lower mortality rate than those with sedentary behavior. The Harvard alumni study (Pfaffenbarger et al. 1986) showed that levels of self reported physical activity were associated with all cause mortality. The findings showed an inverse dose-response relationship between physical activity and the risk of all cause mortality. Death rates were 25-33% lower among subjects who expended 2000 kcal per week extra compared with those who expended less than that. Even when controlled for smoking, hypertension, body mass change, and early parental death, these findings remained

significant. A review of other investigations of associations between physical activity and all cause mortality shows broadly consistent results (Lee & Pfaffenbarger, 1996)

A stronger test for causal relationship between physical activity and mortality is to examine the effect of changing from lower to higher levels of physical activity. The Harvard Alumni Health study (Pfaffenbarger et al. 1993) showed that subjects who took up moderately intense sports activity during the follow up period had a 23% lower death rate than the sedentary subjects. The findings revealed that changes in exercise habits were associated with changes in mortality risk. Similar findings were reported in the British Regional Heart Study (Wannmethee et al. 1998). These studies support the hypothesis that inactive people can lower their risk of dying prematurely by becoming moderately physically active.

The Aerobics Centre Longitudinal Study (Blair et al. 1989) showed that subjects in the lowest fitness quintile had the highest risk of death. The lowest risk of death was found in men in the highest quintile of fitness and in women in the second highest quintile of fitness, respectively. This trend was stable after statistical adjustment for age, smoking, cholesterol level, systolic blood pressure, fasting blood glucose level and parental history of coronary heart disease. Another study (Myers et al. 2002) included men with and without CVD. In both groups the mortality risk for those in the lowest fitness quintile was four times higher than for those in the highest fitness quintile. Fitness in itself is a component for health but it can also be used as an indirect measure for physical activity.

Results from the Aerobics Centre Longitudinal Study (Blair et al. 1995) disclosed that changes in physical fitness have an effect on mortality. Compared to those who were unfit on both measured occasions, the age-adjusted relative risk of death was 44% lower for those who were fit on the first but unfit on the second occasion and 67% lower for those who were fit on both occasions. These studies provide evidence that changes in activity habits have an influence on mortality risk, particularly if these changes result in an improvement in physical fitness (Blair et al. 1995) Increased moderate physical activity is also beneficial within different risk groups.

The Established Populations for Epidemiological Studies of the Elderly (EPESE) found that both moderate and high level physical activity increase life expectancy while reducing the amount of time spent with disability prior to death (Ferrucci et al. 1999). The EPESE also found that physical activity can reduce the risk of disability prior to death among those who survive to very old age. Those with higher levels of physical activity nearly doubled the probability of being free from activities of daily living disability prior to death (Leveille et al. 1999).

There is evidence that overweight people can decrease their risk of disease and lengthen their lifespan just by becoming more fit (Barlow et al. 1995).

2.3.2 Physical activity and disease

Regular physical activity has been shown to reduce both, the incidence of myocardial infarction and coronary heart disease morbidity and mortality (Sherman et al. 1999). A graded response can be seen, with more vigorous levels of activity being associated with a greater reduction in coronary heart disease outcome measures (Manson et al. 1999)

The Nord-Trondelag health survey in Norway (Ellekjaer et al. 2000) reviewed different levels of physical activity on women over a ten-year period. After controlling for potential confounding factors, they found statistically significant reductions in stroke mortality in women aged 50 to 69 and 70 to 79 years. The most active women had an adjusted relative risk of 0.42 and 0.56, respectively. In the 80 to 101 year age group, there was a consistent negative association with physical activity; the adjusted relative risk for the most active was 0.57.

Physical activity can also be beneficial in reducing blood pressure. A literature review (Hagberg et al. 2000) showed that exercise training decreases blood pressure in approximately 75% of individuals with hypertension. Individuals with controlled hypertension may participate in an exercise program, but should be evaluated, treated and monitored closely. Preliminary peak or symptom-limited exercise testing may be warranted, especially for men over 45 and women over 55 years who are planning a vigorous exercise program

Physical activity seems to reduce the risk of becoming depressed, as well as to reduce the symptoms of depression and to improve the outlook of people with depression. A longitudinal study of the effect of different forms of physical activity on depression and psychological well being in older people (Morgan et al. 1998) found that lower levels of outdoor/leisure activity at baseline were significantly associated with depression at follow-up four years later.

Moderate physical activity significantly reduces the risk of Type II diabetes. Compared with inactive men, moderately active men had a 60% lower relative risk of Type II diabetes (Perry et al. 1995). Another study (Hu et al. 1999) found that between 30 and 50% of new cases of Type II diabetes could be prevented by moderate or vigorous physical activity.

Obesity levels are of increasing concern in the developed world. Obesity is an important risk factor for Coronary heart disease and diabetes, osteoarthritis and a number of other diseases. There is evidence that inactivity is the most important factor of weight gain over time (Weinsier et al. 2002). Prolonged physical activity was shown to be beneficial in the prevention, maintenance and treatment of obesity (Grundy et al. 1999).

There is evidence that physically active men and women have a lower risk of colon and breast cancer. Physical activity might also be beneficial in preventing other forms of cancer (Friedenreich, 2001).

2.4 Health enhancing physical activity (HEPA)

2.4.1 Toronto Model

The model presented in Figure 1 describes the relationships between physical activity, health-related fitness and health in the adult population.

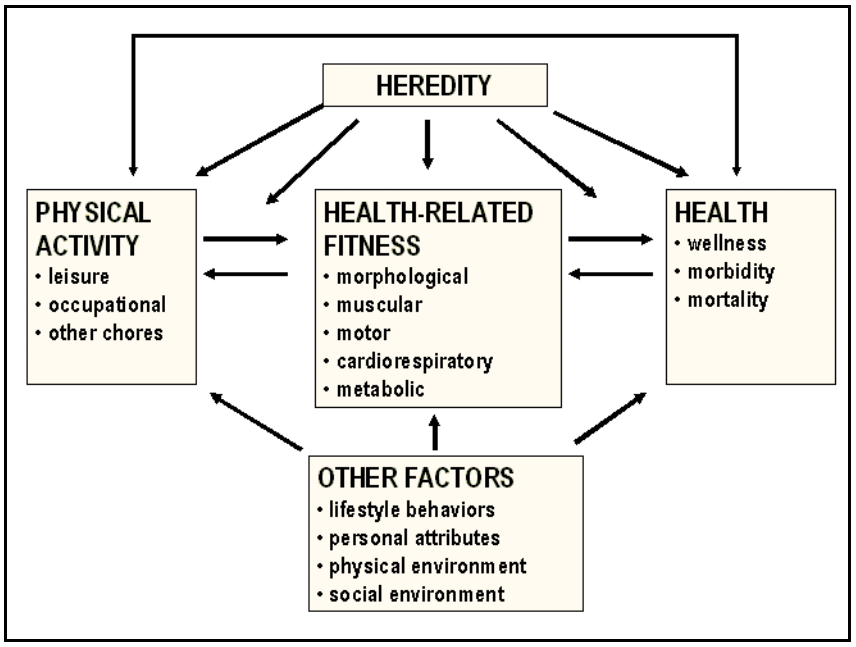

Figure 1 Toronto model (Bouchard & Shephard, 1994)

Physical activity may influence fitness, which in turn may modify the level of physical activity. With increasing fitness, people tend to become more active, and the fittest persons tend to be the most active. The association between fitness and health is also reciprocal. Fitness influences health, but health status also influences both physical activity and fitness (Bouchard & Shephard, 1994). Physical activity, fitness and health; are also influenced by other factors such as other lifestyle factors besides physical activity, personal attributes, physical and social environment. Lifestyle behaviours include smoking, diet, alcohol consumption and sleeping patterns. Several personal attributes, such as age, gender, socio-economic status, personality, motivation and attitude toward physical activity and other health habits may shape a person's lifestyle pattern. Social environment combines social, cultural, political, and economic conditions, that affect physical activity, fitness and health. Environmental conditions, such as temperature, humidity, air quality, altitude and climatic changes, may influence physical activity, health-related fitness and health. (Bouchard & Shephard, 1994) Heredity has an impact on all three components of the model: physical activity, fitness and health. There are inherited differences in the levels of physical activity and in the

components of health-related fitness. Interaction between the genes and the environment is largely responsible for the variability in the health-related phenotypes in response to physical activity. Different genotypes may be at different risk for diseases associated with physical inactivity and a low level of health-related fitness. (Bouchard & Pérusse, 1994.)

2.4.2 Dose response relationship

The effect of physical activity depends on the mode, intensity, frequency and duration of exercise. The dose-response relationship is characterized by (1) a threshold, below which little or no adaptation takes place, (2) a zone of increasing effect, and (3) an upper limit beyond which only little or no improvements occur and/or potential risks and harms increase. (Bouchard, 1994). Practically, that means that a certain amount of physical activity is needed to get a benefit. Once the threshold is reached, there is an area in which the benefits increase (from 30 min moderate- to more vigorous or longer physical activity). After a certain point, (very hard, competitive sports) the risks and harms increase.

The dose–response effect involves many aspects of exercise. Besides type, intensity, duration, frequency, and total volume of exercise, the baseline physical activity or fitness level influences the response to a certain dose. Genetic determinants also have an influence.

The traditional approach says that physical activity must produce a training response in the form of a progressive change in function or structure, resulting from long term adaptations to repeated physical activity that lasts longer and is independent from a single bout of exercise to be of benefit. Today there is evidence that health related biological changes related to physical activity might be due to acute biological responses during and some time after training. (Bouchard, 1994; Thompson, 2001). Therefore, physical activity does not need to result in a training effect to elicit health benefits. The threshold of intensity or duration for health benefits is probably lower than the threshold for cardio respiratory training. Total volume or total energy expenditure seem to be the most important factors for health benefits (Murphy et al. 1998) rather than single components like frequency, duration or intensity. Observational studies

show a graded dose response relationship between the total volume of physical activity and all cause mortality, stroke and several CHD risk factors. Randomised control trials show a crude, graded dose response relationship between the total weekly volume of physical activity and VO_2max (U.S. DHHS, 1996; Oja, 2001).

2.4.3 Lifestyle physical activity

Lifestyle physical activity is physical activity that is performed during daily life in different ways including exercise and sport but not exclusively those.

Based on the evidence of the health benefits of physical fitness, earlier guidelines addressed the amount and type of exercise that is needed to improve physical fitness (ACSM, 1978). However, since large parts of many populations are sedentary, these guidelines seem not compatible for them. For example, more than 60% of adult Americans are not physically active on a regular basis, and 25% of them do not engage in any leisure time activity (U.S. DHHS, 1996).

The benefits of physical activity seem to be inversely associated with baseline physical activity levels, which means the greatest health benefits can be expected when inactive individuals become moderately active (Blair SN et al. 1992).

A large part of energy expenditure during one week is derived from daily living activities. Increasing the activity levels of every day life might have great health potential (Pate et al. 1995).

Structured exercise or normal fitness training requires a certain level of baseline fitness, skills, and equipment. It is time consuming and therefore extends the day or competes with other daily duties or interests. Lifestyle physical activity does not require any specific equipment or skills and can be integrated into daily life. That does not mean lifestyle physical activity should replace structured exercise, but especially for sedentary people this approach is useful to increase and maintain healthier physical activity levels.

2.4.4 Recommendations for Physical activity

Today, recommendations for physical activity aim not only to improve or maintain physical fitness, but also to achieve health benefits. The U.S. Surgeon General's report (U.S. DHHS, 1996) stated that significant health benefits can be obtained by accumulating a moderate amount of physical activity on most, preferably all days of the week. Adults are recommended to have 30 minutes of moderate activity on most, preferably all days of the week.

2.5 Measurement of physical activity

2.5.1 Overview

Physical activity is a complex behaviour and therefore is difficult to measure. Physical activity measurement techniques are used to describe physical activity habits in populations and to assess changes in physical activity behaviour over time. Accurate, precise and reproducible measurements are needed to relate physical activity to health, to classify physical activity levels in intervention studies, and to identify behavioural correlates of physical activity (Ainsworth et al. 1994).

Physical activity can be assessed in various ways, either directly or indirectly. Indirect measurements use outcomes that are considered to be correlated with physical activity, such as fitness (VO_2max, VO_2submax), body composition or specific exercise tests. Direct measurements can use either objective or subjective tools.

Objective tools include the doubly labelled water technique, pedometers, accelerometers, and heart rate monitoring.

The doubly labelled water technique is considered the gold standard for measuring energy expenditure because of its high validity. This technique uses the differences between the rate of loss of ^{18}O and ^{2}H to estimate carbon dioxide production. From this oxygen uptake and thus energy expenditure can be calculated. This method is very costly and it only assesses total energy expenditure and does not provide data about type, frequency, intensity or duration of physical activity (Montoye et al, 1996).

Pedometers are simple mechanical movement counters, which count steps in response to vertical acceleration of the body. Pedometers count only the number of movements and not intensity or duration.

Accelerometers are small computer motion sensors, which measure the intensity, duration and frequency of activity. Their use is recommended in conjunction with log books to enable information to be collected on the type of physical activity and whether it was undertaken for work, as part of non-leisure or leisure-time physical activity. The unidimensional accelerometers assess vertical movement of the trunk. It is useful for measuring movements with an important vertical component, such as activities and sports that include walking or running. However, many activities such as bicycling, swimming, weight lifting, and skating cannot be assessed (Montoye et al, 1996).

Heart rate monitoring can be used to estimate the workload or intensity of activity because heart rate is correlated with oxygen uptake. Provided that a person's individual heart rate and oxygen uptake curve have been determined during a fitness test, energy expenditure can be estimated from heart rate (Montoye et al, 1996). This method is especially useful to measure activity intensity and is most appropriate in measuring vigorous activity. However there are problems to detect light or moderate intensity activities because slightly elevated heart rates can also be due to mental stress and not physical activity (Sallis & Owen, 1999).

Subjective measurements include observations and instruments for self-reporting of physical activity.

Direct observations use the information gathered directly, or from film or videotapes to characterize physical activity. Direct observation is a comprehensive and accurate physical activity assessment tool. It is free from recall or self reporting bias and it can be used for different periods of time and in a variety of settings. It does not involve any equipment that may hinder participants' movements. However, it is not applicable for large-scale epidemiological research because it is time consuming and costly, and the participant is observed in his privacy. Knowledge of observation may lead to changes in the usual physical activity behaviours. Nevertheless it is an appropriate tool in small case studies, studies involving children and for questionnaire validation (Ainsworth et al. 1994).

Self reporting techniques use different tools that ask people for their PA level and then convert the information gathered into estimates of energy expenditure such as kcal or METs.

Physical activity records and diaries and physical activity logs are retrospective methods, but attempt to record physical activity more time real. With physical activity records and diaries, the participants write down or record which kind of activity they are doing in certain time intervals along with the intensity and duration. This gives accurate indices of daily energy expenditure for groups (U.S. DHHS, 1996) but does not reflect long-term physical activity patterns. Diaries require a large effort and motivation from the participants. Additionally data coding and analyses are time consuming. Therefore, this method is not applicable for large-scale epidemiological research (Ainsworth et al. 1994).

Physical activity logs are modified PA records for a specified type of physical activity. The participants only record the type of physical activity that is of interest for the study (Ainsworth et al. 1994).

Recall surveys are used to assess participants` physical activity retrospectively. Global self assessment asks the participants to rate their physical activity in comparison to the population or people of their age group and sex. It does not provide detailed information about physical activity habits and tends to best represent vigorous physical activity. The disadvantage is that the reported rate does not necessarily represent the same levels of physical activity in different people (Ainsworth et al. 1994).

Retrospective quantitative histories are used to get detailed qualitative and quantitative information about physical activity during long time periods. This approach is usually long and detailed and requires an interviewer for assessment.

Recall questionnaires use either self reported responses or an interviewer. Recall questionnaires provide information about a variety of physical activity and are commonly used for epidemiological research because the time and cost efforts are reasonable. They are easy to administer, do not require much motivation or effort from participants and do not change participant’s physical activity behaviour. Validation studies show that heavy physical activity, structured exercise and sports are easily

recalled, while moderate intensity activities are less likely to be recalled accurately (Montoye, 1996).

Recall questionnaires are commonly used to assess the prevalence of physical activity in populations, but the variability of questionnaires, kinds of physical activity surveyed, characters of participants, time frame sampled and reading levels of instruments may lead to over- or underestimation of physical activity in different populations (Ainsworth et al. 1994). To get comparable data, the content and design of physical activity questionnaires for population surveys need to be standardized.

The first studies about physical activity and the correlates to health used comparisons between subjects with occupations with high physical activity at work and low physical activity at work. From the 1960´s, studies used mostly leisure time physical activity and sports to assess physical activity because heavy occupational work was decreasing.

Considering the fact that total energy expenditure is derived from all activities during daily life, questionnaires that measure total physical activity are needed. To assess the prevalence of physical activity in a population and to compare data from different populations, a comparative tool that assesses all domains of physical activity is needed. For the reasons discussed earlier, questionnaires are the best approach for populations.

2.5.2 The International Physical activity questionnaire (IPAQ)

In response to the demand for comparable and valid measures of physical activity within and between countries and the lack of instruments covering all health related aspects of physical activity, an international consensus group, consisting of an international group of physical activity assessment experts was formed in 1998. The consensus group began the process of developing, method testing and testing the implication of the International Physical activity questionnaire (IPAQ).

The questionnaires were designed to assess all health related aspects of physical activity and sedentary behaviours. The IPAQ is available in 4 different forms; a long and a short self-administered format, and a long and a short telephone administered format, addressing the last 7 days. The IPAQ includes questions about time spent in vigorous and moderate activities in the domains work, transportation, household and leisure time,

about time spent cycling and walking and time spent sitting. The long format questionnaire also asks about the intensity of cycling and walking (www.ipaq.ki.se).

The IPAQ questionnaires were subjected to a validity and reliability evaluation in 2000 (Craig et al, 2003). Studies were conducted in 14 research centres in 12 countries on 6 continents using standardized methods and protocols. The purpose of these studies was to investigate the short-term, test-retest reliability and concurrent validity. Subjects included approximately 2,450 males and females in 14 countries with a mean age in each country ranging from 25 to 49 years. Test-retest reliability was conducted by having subjects repeat the IPAQ over a 3 to 7 day period. Criterion validity was determined by having subjects wear an accelerometer for 7 consecutive days. Spearman's Rho clustered around 0.8 indicating reliable responses between repeat administrations for all versions of the IPAQ. Criterion validity had a median rho of about 0.30 against the CSA accelerometer for minutes of moderate, vigorous, walking, and sedentary behaviours. This indicates that the IPAQ instruments have acceptable measurement properties, at least as good as other established self-report instruments. The IPAQ instruments are recommended as a viable method of monitoring population levels of physical activity globally for population 18-69 years of age.

The Swedish version of the IPAQ was evaluated for validity and reliability in 2000 (Hagströmer, 2000) and was considered to be a reliable and valid instrument for assessing physical activity in population based studies.

Most studies assessing physical activity are focused on leisure time physical activity. In Sweden and most other countries, no data on total physical activity is available. To be able to assess total physical activity in populations, describe changes and correlates, and compare data between countries, data are needed that include all health enhancing physical activity.

3 AIM AND OBJECTIVES

3.1 Aim of the study

The aim of this study was to describe levels of HEPA in the Swedish adult population, as assessed with IPAQ, as well as to investigate HEPA in the different domains and subgroups.

3.2 Research Questions

1. How large is the proportion of sedentary people in the study group?
2. What is the level of HEPA in the study group and what are the differences across gender, age, socio-economic status (SES), and body mass index (BMI)?
3. What are the levels of HEPA in the domains work, transportation, household and leisure time and what are the differences across gender, age, socio-economic status, and BMI?

4 METHODS

4.1 Study design

The assigned telemarketing company (Markör Ltd, Örebro, Sweden) randomly selected 3000 adults between 18 and 70 years from Sweden.

In the time between October 2000 and February 2002, the questionnaires were sent by mail to approximately 30-40 randomly selected subjects each week. In total 1834 subjects answered the questionnaire.

4.2 Subjects

The final study group consisted of 1592 subjects, of which 53.3% were female (n=849) and 45.5% were male (n=724). For 1.2% (n=19) information about gender and age was not available. The mean age was 46.5 ± 14.7 (range 18-76) (Table 2).

The mean BMI was 25.1 ± 3.9 (range 16.3-55.2). Overweight, defined as a BMI greater than 25 kg/m^2 was seen in 34 % of the subjects (27,8% of females, 42.1% of males). Obesity, defined as a BMI greater than 30 kg/m^2 was seen in 9.6 % of the subjects (10.2% of females, 9.1% of males) (Table 3).

Workers and middle employees built the largest occupational groups (Table 4).

Table 2 Subjects by age group

Age	Female		Male		Total	
	N	Percent	N	Percent	N	Percent
<25	57	6.7	52	7.2	109	6.8
25-34	150	17.7	140	19.3	290	18.2
35-44	169	19.9	142	19.6	311	19.5
45-64	366	43.1	284	39.2	650	40.8
65+	107	12.6	106	14.6	213	13.4
Missing	0	0.0	0	0.0	19	1.2
Total	849	100	724	100	1592	100

Table 3 Subjects by BMI group

BMI	Female		Male		Missing	Total	
($kg/m^{2)}$	N	Percent	N	Percent	N	N	Percent
<20	75	8.8	15	2.1	0	90	5.7
20-25	424	49.9	316	43.6	0	740	46.5
25-30	236	27.8	305	42.1	0	541	34.0
>30	87	10.2	66	9.1	0	153	9.6
Missing	27	3.3	22	3.1	19	68	4.2
Total	849	100	724	100	19	1592	100

Table 4 Subjects by socio-economic status

SES	Female		Male		Missing	Total	
	N	Percent	N	Percent	N	N	Percent
Student	22	2.6	24	3.3	0	46	2.9
Worker	281	33.1	270	37.3	0	551	34.6
Lower employee	133	15.7	73	10.1	0	206	12.9
Middle employee	217	25.6	142	19.6	0	359	22.6
Higher employee	109	12.8	121	16.7	0	230	14.4
Self-employed	25	2.9	24	3.3	0	49	3.1
Farmer	1	0.1	7	1.0	0	8	0.5
Missing	61	7.2	63	8.7	19	143	9
Total	849	100	724	100	19	1592	100

4.3 Ethical approval

The study was approved by the ethical committee of Karolinska Institutet, diary number 378/02.

4.4 Questionnaire

The questionnaire was developed by a project management group. Two of the three parts of the original questionnaire were used for this study. The first section consisted of background questions about age, gender, anthropometrics, socio-economic-status,

occupation, attitude, barriers and stages of change for physical activity and food habits, and some questions about physical activity, which are commonly used for epidemiological studies in Sweden. The second section was the long format, self-administered IPAQ that addressed the last seven days (Attachment). The IPAQ included questions about moderate and vigorous activities as well as about walking and cycling in the domains work, transportation, household and leisure time. Subjects were asked for the number of days and the hours or minutes per day spent in each activity. For walking and cycling, they were also asked for the intensity.

4.5 Calculation

Data were entered in Microsoft Access (Microsoft Access 2000, Microsoft Corporation) and transferred to Statistical Package for Social Sciences (SPSS version 12.0.1, 2003, SPSS Inc., Chicago, IL) for analysis.

Days and minutes in the different physical activity domains work, transport, domestic and leisure, were calculated into minutes per week. HEPA levels for work, transport, domestic and leisure time (in minutes per week) were derived from moderate and vigorous activities in the corresponding domains. The terms domestic and household are used synonymously in the following text. Subjects were considered sedentary if they did not reach 150 minutes of HEPA per week. In the following text, sedentarism and physical inactivity are used synonymously.

Subjects were categorized into subgroups of gender (female, male), age <25, 25-34, 35-44, 45-64, and 65+ years), socio economic status derived from profession (student, worker, lower, middle and higher employee, self-employed and farmer) and BMI groups of normal weight (<25), over weight (25-30) and obese (>30).

4.6 Data reduction and coding

Subjects that did not fill in the IPAQ were excluded from the analysis as well as subjects who only filled in either number of days or number of minutes spent in activities. Inconsistent answers and no answers in the activity variables were recoded to 0 minutes/week.

To avoid distortion from outliers, time for vigorous and moderate activities at work and for vigorous and moderate walking at work was restricted to 600 minutes per week (2 hours per weekday) and time for normal walking to 1200 minutes per week (4 hours per weekday). Time for bike transport, walking transport, vigorous and moderate garden work, moderate housework, leisure time walking, vigorous sports and moderate sports was restricted to 840 minutes per week (2 hours per day).

4.7 Drop out

External drop out: Out of 3000 selected subjects, 2728 subjects were reached by phone. Out of these, 1834 subjects agreed to participate.

Internal drop out: After excluding subjects as described in data reduction, the study group consisted of 1592 subjects.

4.8 Statistics

Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS version 12.0.1, 2003, SPSS Inc., Chicago, IL).

Because the data was not normally distributed, the results are presented as median (25^{th}-75^{th} percentile). Analysis among subgroups was carried out using Mann-Whitney-U test for gender and Kruskal-Wallis test for age groups, socio economic status and BMI groups. Pearsons Chi square was used for analysis of proportions of physical inactivity among subgroups. The level of significance was set to $p<0.05$. After using Kruskal-Wallis tests, Post hoc analysis was carried out using Mann-Whitney tests with Bonferroni correction.

5 RESULTS

5.1 Physical inactivity

In total 23.2 % of the study population were classified as sedentary, 24.7 % of women and 21.1 % of men were sedentary, but this difference was not statistically significant.

There were statistically significant differences in physical inactivity between age groups for the total study group and women ($p<0.001$). The proportion of physical inactivity in the different age groups ranged from 13.5 % (for 35 to 44 year olds) to 31.5 % (for 65 years and older). The 35-44 age group showed the lowest proportion of inactive subjects (Table 5).

Table 5 Proportion of physical inactivity by age group (in %) n=1573

Age	<25	25-34	35-44	45-64	65+	p †
Female	15.8	28.0	11.2	28.4	33.6	<0.001
Male	21.2	15.7	16.2	23.2	29.2	0.050
Total	18.3	22.1	13.5	26.2	31.5	<0.001

† Pearsons Chi square

The highest proportion of physical inactivity was seen in higher employees, the lowest proportion in the self-employed (Table 6). Because of the small number of student, self-employed and farmer subjects, the percentages of physical inactivity for these groups are not shown in figure 2.

Table 6 Proportion of physical inactivity by socio-economic status (in %) n=1449

SES	Student	Worker	Lower employee	Middle employee	Higher employee	Self-employed	Farmer	p †
Female	4.5	18.1	30.8	29.0	34.9	16.0	100.0	0.001
Male	33.0	21.1	17.8	19.7	27.3	12.5	14.3	0.354
Total	19.6	19.6	26.2	25.3	30.9	14.3	25.0	0.005

† Pearsons Chi square

Excluding students, self-employed and farmers, the proportion of sedentary subjects was lowest in workers and highest in higher employees. When split by gender, the same pattern is seen in women (Figure 2).

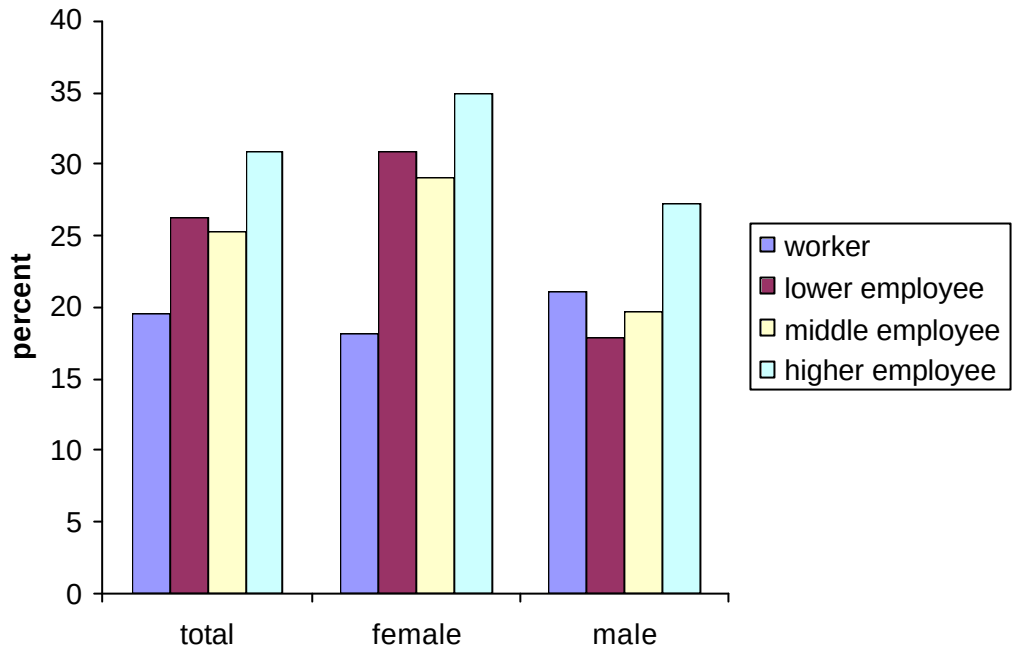

Figure 2 Proportion of physical inactivity by socio-economic status (in %)

The proportion of physically inactive subjects increased with increasing BMI for the total sample and for women (Table 7).

Table 7 Proportion of physical inactivity by BMI group (in %) n=1524

BMI	<25	25-30	>30	p †
Female	22.6	27.1	34.5	0.046
Male	18.4	22.0	25.8	0.306
Total	21.0	24.2	30.7	0.023

† Pearsons Chi square

5.2 Total HEPA, vigorous and moderate activity

The self reported level of total HEPA was a median of 490 (180-1080) minutes per week. The level of reported vigorous activity was at a median of 30 (0-240) minutes per week, moderate activity was a median of 360 (90-210) minutes per week.

Men reported significantly more total HEPA and vigorous activity than women. Conversely, women reported significantly more moderate activity (Table 8).

Table 8 Total HEPA, vigorous and moderate activity by gender in median (25^{th}-75^{th} percentile) minutes/week

	Men	Women	p †
HEPA total	540 (180-1236)	450 (150-1030)	0.040
Vigorous activity	100 (0-447)	0 (0-120)	<0.001
Moderate activity	307 (60-780)	390 (120-840)	0.009

† Mann-Whitney-U test

There were statistically significant differences across age groups for HEPA total, moderate and vigorous activity. The highest levels of HEPA total and moderate activity were reported in the 35 to 44 age group, and the lowest in the 65 and older age group. The 25 to 34 age group showed the second lowest level (following the 65 and older age group) of HEPA total and moderate activity. Levels of vigorous activity decreased with age (Table 9).

Table 9 HEPA total, vigorous and moderate activity by age group in median (25^{th}-75^{th} percentile) minutes/week

	<25	25-34	35-44	45-64	65+	p †
HEPA total	589 (220-1405) [e]	450 (180-1111) [c]	630 (250-1260) [b,d,e]	480 (120-1050) [c]	375 (85-960) [a,c]	<0.001
Vigorous activity	120 (0-712) [c,d,e]	60 (0-360) [d,e]	60 (0-300) [a,d]	0 (0-200) [a,b,c]	0 (0-142) [a,b,c]	<0.001
Moderate activity	445 (120-812)	300 (60-720) [c]	480 (180-850) [b,d,e]	355 (90-840) [c,e]	270 (60-735) [c,d]	<0.001

† Kruskal-Wallis test

[a] Significantly different from age group <25 at p<0.05 after Bonferroni correction

[b] Significantly different from age group 25-34 at p<0.05 after Bonferroni correction

[c] significantly different from age group 35-44 at p<0.05 after Bonferroni correction

[d] Significantly different from age group 45-64 at p<0.05 after Bonferroni correction

[e] Significantly different from age group 65+ at p<0.05 after Bonferroni correction

The differences in total HEPA between age groups were significant for women (p<0.001) but not for men. The age group with the highest level of HEPA was from 35 to 44 for women. The lowest levels of HEPA were reported in the 65 and older age group followed by the 25 to 34 age group (Figure 3).

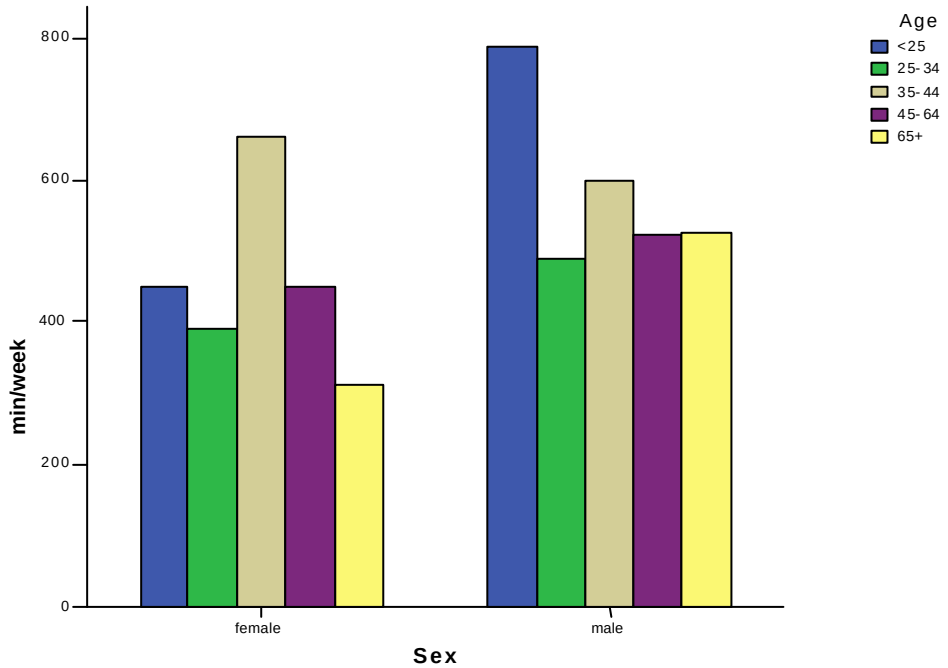

Figure 3 Median level of HEPA total by age group stratified by gender

The highest levels of HEPA, vigorous activity and moderate activity were reported for farmers. Kruskal-Wallis test was run for all social-economic-status groups, but due to the small number of subjects for students (N=46), self-employed (N=49) and farmers (N=8), these groups are not presented in table 10. There were statistically significant differences across workers, lower, middle and higher employees in all domains. Workers reported higher levels of HEPA, vigorous activity and moderate activity than employees (Table 10).

Table 10 HEPA total, vigorous and moderate activity socio-economic status in median (25^{th}-75^{th} percentile) minutes/week

	Worker	Lower employee	Middle employee	Higher employee	p †
HEPA total	780 (240-1515) [b,c,d]	450 (138-1005) [a]	390 (135-840) [a]	322 (100-720) [a]	<0.001
Vigorous activity	60 (0-690) [b,c,d]	0 (0-150) [a]	0 (0-135) [a]	0 (0-120) [a]	<0.001
Moderate activity	570 (130-870) [b,c,d]	360 (108-858) [a]	270 (80-660) [a]	240 (60-541) [a]	<0.001

† Kruskal-Wallis test

[a] Significantly different from workers at p<0.05 after Bonferroni correction

[b] Significantly different from lower employees at p<0.05 after Bonferroni correction

[c] Significantly different from middle employees at p<0.05 after Bonferroni correction

[d] Significantly different from higher employees at p<0.05 after Bonferroni correction

When split by gender the differences in total HEPA between workers, lower, middle and higher employees were significant for women and men (p<0.001). For both genders workers reported more total HEPA than employees (Figure 4).

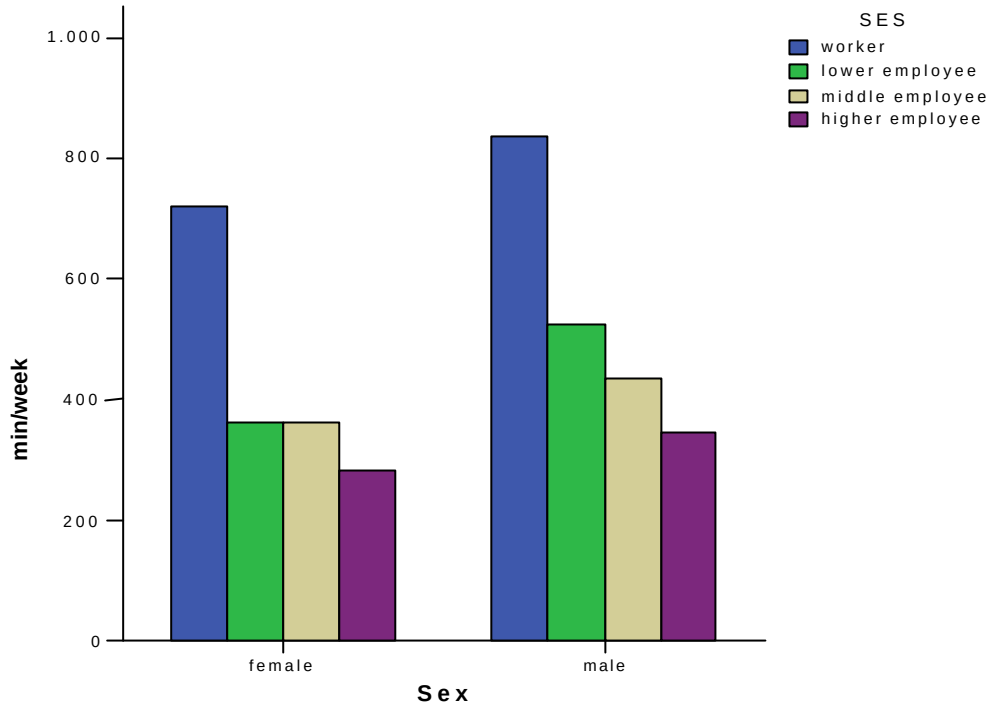

Figure 4 Median level of HEPA total by socio-economic status stratified by gender

There were no statistically significant differences in HEPA total, vigorous and moderate activity across normal weight, overweight and obese subjects. For the normal weight subjects the level of vigorous activity was at a median of 30 minutes per week. Among this group 52.4% reported vigorous activity. For the obese subjects the median for vigorous activity was 0. In this group, 45.8% reported vigorous activities (Table 11).

Table 11 HEPA total, vigorous and moderate activity by BMI group in median (25^{th}-75^{th} percentile) minutes/week

	<25	25-30	>30	p †
HEPA total	480 (180-1050)	530 (160-1200)	440 (100-1047)	0.296
Vigorous activity	30 (0-212)	20 (0-315)	0 (0-330)	0.631
Moderate activity	360 (120-810)	360 (80-840)	300 (60-720)	0.062

† Kruskal-Wallis test

5.3 HEPA at work, transportation, household and leisure time

One third (33.2%) of the study group reported HEPA at work, which resulted in a median value of 0 (0-180) minutes/week. The level of HEPA for transport was 0 (0-60), with 30.5% of the study group reporting activities in this domain. The level of domestic HEPA was a median of 120 (0-360) minutes/week with 74.2% of the study group reporting activities in this domain and 50 (0-210) minutes/week for leisure time HEPA, with 55.2% of the study group reporting activities in this domain.

Women reported significantly more domestic HEPA than men (Table 12).

Table 12 HEPA in domains by gender in median (25^{th}-75^{th} percentile) minutes/week

	Men	Women	p †
HEPA work	0 (0-360)	0 (0-90)	<0.001
HEPA transport	0 (0-13)	0 (0-80)	0.001
HEPA domestic	90 (0-360)	120 (20-377)	0.002
HEPA leisure	60 (0-225)	45 (0-210)	0.605

† Mann Whitney-U test

There were statistically significant differences across age groups for all HEPA domains. The 35 to 44 age group reported the highest levels of domestic HEPA. Leisure time HEPA decreased with increasing age (Table 13).

Table 13 HEPA in domains by age group in median (25^{th}-75^{th} percentile) minutes/week

	<25	25-34	35-44	45-64	65+	p †
HEPA work	120 (0-600) [b,c,d,e]	0 (0-240) [a,e]	0 (0-450) [a,d,e]	0 (0-180) [a,c,e]	0 (0-0) [a,b,c,d]	<0.001
HEPA transport	0 (0-130) [d,e]	0 (0-80) [d,e]	0 (0-90) [d,e]	0 (0-0) [a,b,c]	0 (0-0) [a,b,c]	<0.001
HEPA domestic	50 (0-225) [c,d,e]	60 (0-258) [c,d,e]	200 (30-450) [a,b]	120 (0-390) [a,b]	150 (0-480) [a,b]	<0.001
HEPA leisure	120 (0-360) [c,d,e]	80 (0-240) [d,e]	45 (0-210) [a]	30 (0-202) [a,b]	0 (0-180) [a,b]	<0.001

† Kruskal-Wallis test

[a] Significantly different from age group <25 at p<0.05 after Bonferroni correction

[b] Significantly different from age group 25-34 at p<0.05 after Bonferroni correction

[c] significantly different from age group 35-44 at p<0.05 after Bonferroni correction

[d] Significantly different from age group 45-64 at p<0.05 after Bonferroni correction

[e] Significantly different from age group 65+ at p<0.05 after Bonferroni correction

When split by gender, the differences in domestic HEPA between age groups were also significant (women p<0.001 and men p<0.01). It appeared that the high level of domestic HEPA in the 35-44 age group was in women, who reported high levels in this age group, while domestic HEPA levels for men increased until age 35 but then showed the same average level of domestic HEPA as the older age groups (Figure 5).

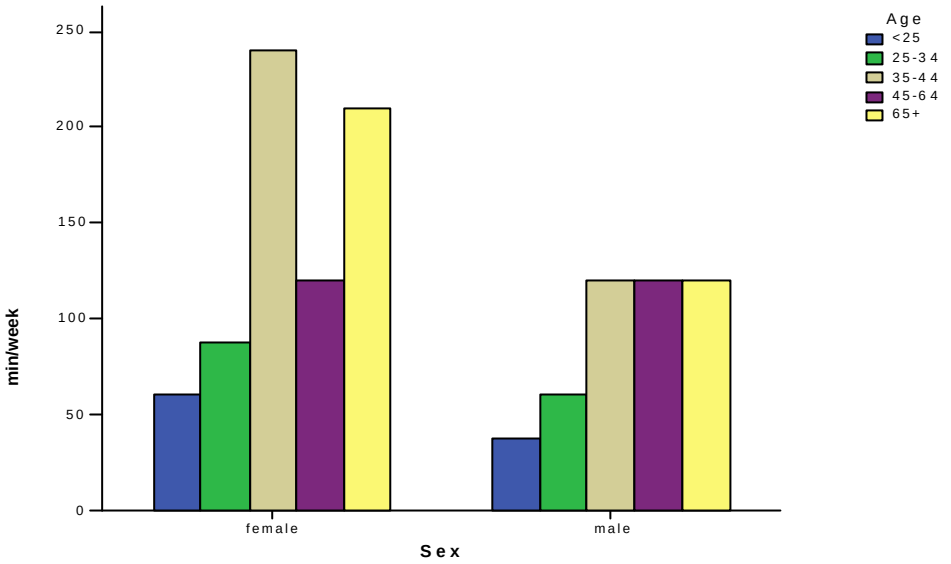

Figure 5 Median levels of domestic HEPA by age group stratified by gender

When split by gender, the differences in leisure time HEPA between the age groups were significant for women ($p<0.01$) and men ($p<0.001$). The median level of leisure time HEPA was the same for women in the first three age groups, while it decreased in the 45-64 age group and was lowest in the oldest age group. In men, the oldest age group had the lowest level of leisure time HEPA followed by the 35-44 age group (Figure 6).

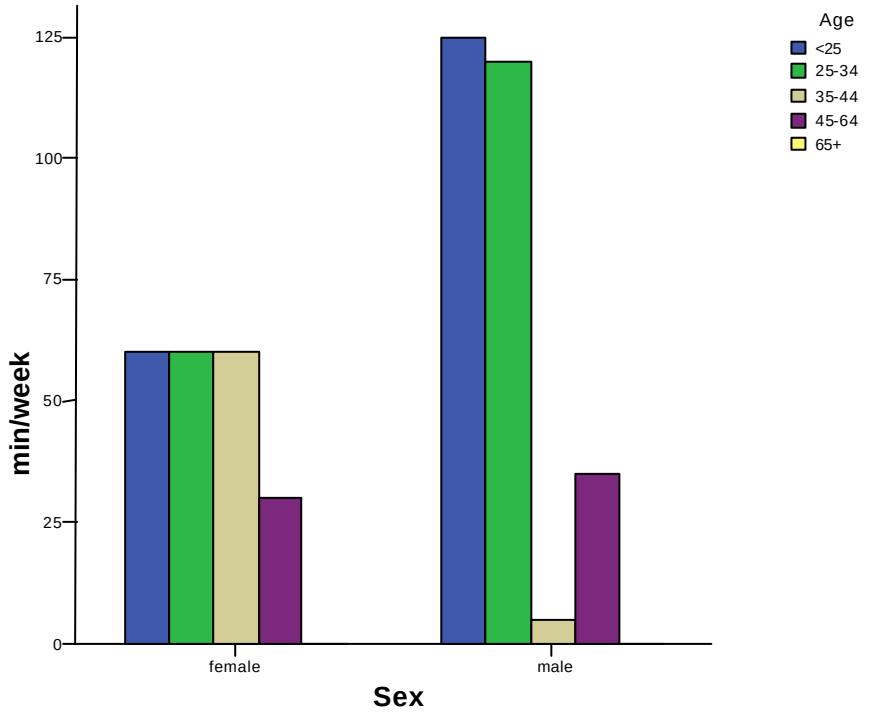

Figure 6 Median levels of leisure time HEPA by age group stratified by gender

The only socio-economic group reporting HEPA at work were farmers. Self- employed subjects reported the highest domestic HEPA of all groups and students reported the highest level of leisure time HEPA. Kruskal-Wallis tests were run for all socio-economic-status groups, but due to the small number of subjects for students (N=46), self-employed (N=49) and farmers (N=8), these groups are not presented in table 14.

There were statistically significant differences across workers, lower, middle and higher employees for HEPA at work and leisure time HEPA. The level of leisure time HEPA was higher in middle and higher employees than in lower employees, while the median level of leisure time HEPA was 0 for workers (Table 14).

Table 14 HEPA in domains by socio-economic status in median (25^{th}-75^{th} percentile) minutes/week

	Worker	Lower employee	Middle employee	Higher employee	p †
HEPA work	0 (0-720)[b,c,d]	0 (0-0) [a,d]	0 (0-15) [a,d]	0 (0-0) [a,b,c]	<0.001
HEPA transport	0 (0-30)	0 (0-45)	0 (0-60)	0 (0-45)	0.392
HEPA domestic	150 (0-480)	120 (20-397)	120 (10-330)	80 (4-300)	0.055
HEPA leisure	0 (0-180) [c,d]	52,5 (0-232)	60 (0-240) [a]	60 (0-210) [a]	<0.001

† Kruskal-Wallis test

[a] Significantly different from workers at p<0.05 after Bonferroni correction

[b] Significantly different from lower employees at p<0.05 after Bonferroni correction

[c] Significantly different from middle employees at p<0.05 after Bonferroni correction

[d] Significantly different from higher employees at p<0.05 after Bonferroni correction

When split by gender, the differences in domestic HEPA between the socio-economic groups were significant for women ($p<0.01$) but not for men ($p=0.581$). For women, workers reported the highest level of domestic HEPA, while it was at the same lower level for lower, middle and higher employees (Figure 7).

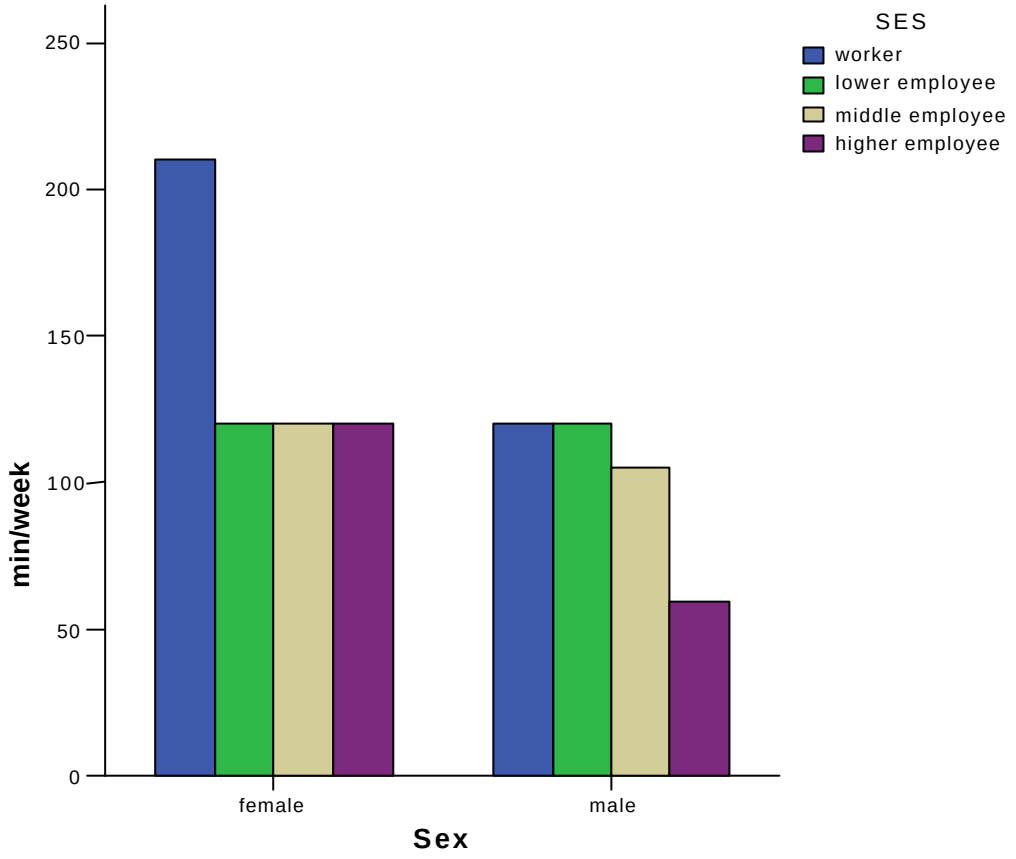

Figure 7 Median levels of domestic HEPA by socio-economic status stratified by gender

There were also significant differences in leisure time HEPA between the socio-economic groups for men ($p<0.001$) but not for women ($p=0.124$). For men, the highest levels were seen in middle employees. The levels for lower and higher employees were lower, while the median level of leisure time HEPA was 0 for workers (Figure 8).

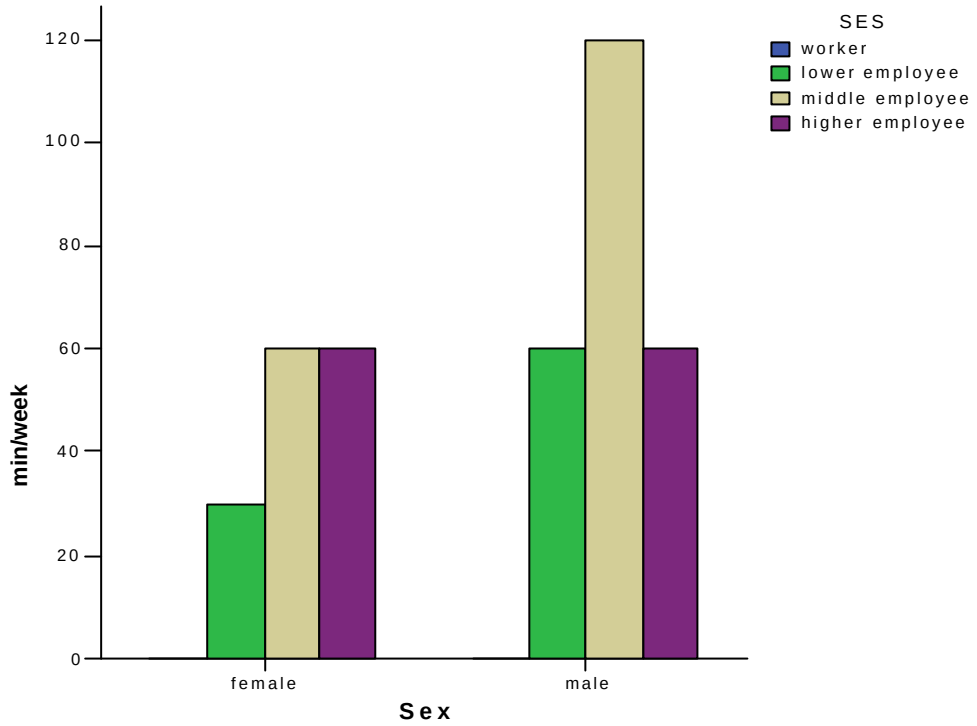

Figure 8 Median levels of leisure time HEPA by socio-economic status stratified by gender

Statistically significant differences across BMI groups appeared only for transport HEPA and leisure time HEPA. Normalweights reported significantly more transport HEPA than the obese. Leisure time HEPA decreased with increasing BMI (Table 15).

Table 15 HEPA in domains by BMI groups in median (25^{th}-75^{th} percentile) minutes/week

	<25	25-30	>30	p †
HEPA work	0 (0-180)	0 (0-180)	0 (0-240)	0.810
HEPA transport	0 (0-75) [c]	0 (0-40)	0 (0-0) [a]	0.018
HEPA domestic	120 (10-360)	120 (0-420)	120 (0-360)	0.756
HEPA leisure	60 (0-240) [b,c]	30 (0-210) [a,c]	0 (0-120) [a,b]	<0.001

† Kruskal-Wallis test

[a] Significantly different from BMI group <25 at p<0.05 after Bonferroni correction

[b] Significantly different from BMI group 25-30 at p<0.05 after Bonferroni correction

[c] Significantly different from BMI group >30 at p<0.05 after Bonferroni correction

When split by gender, the differences in leisure time HEPA were significant for women ($p<0.05$) and men ($p<0.01$). Normal weight subjects reported the highest levels of leisure time HEPA. Overweight subjects reported lower levels while obese subjects reported the lowest levels of leisure time HEPA (Figure 9).

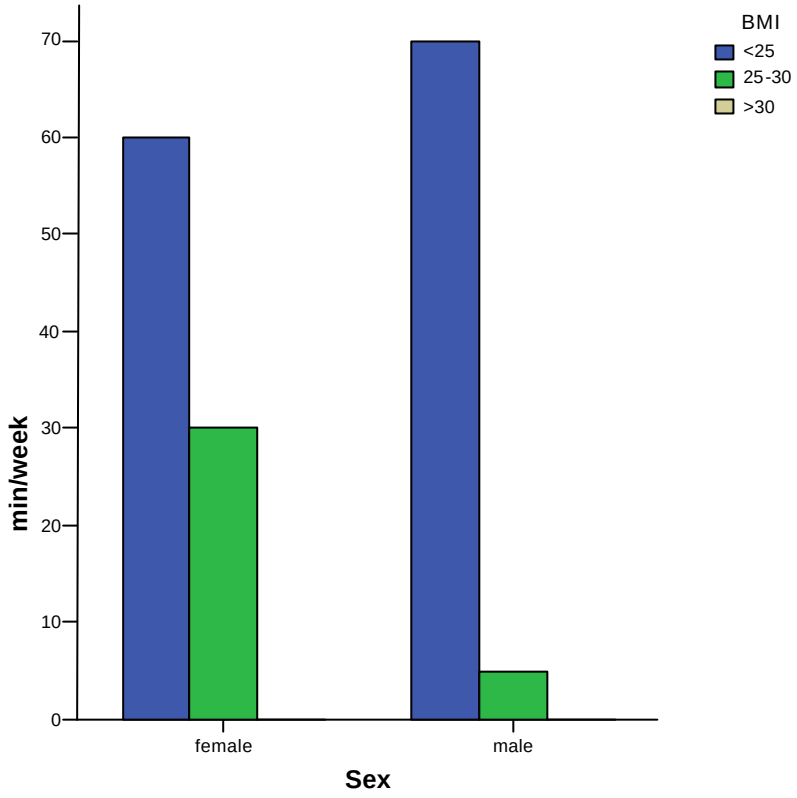

Figure 9 Median levels of leisure time HEPA by BMI groups stratified by gender

6 DISCUSSION

This study was a cross sectional study examining levels of health enhancing physical activity in minutes per week for all health related physical activity in the adult population in Sweden.

The study revealed that 23.2% of the study group were sedentary. The median level of total HEPA was 490 minutes/week. There were significant differences between genders, age groups, socio economic status and BMI groups. Men reported more total HEPA than women. The age group 35-44 years showed the lowest physical inactivity and the highest level of total HEPA. Workers reported more total HEPA than employees. Physical inactivity increased with increasing BMI, while leisure time HEPA decreased with increasing BMI.

Physical activity varies among seasons (Pivarnic et al. 2003). To cover that, the data collection took place between October 2000 and February 2002.

From 3000 randomly selected persons, 2728 subject were reached by phone. A number of 1834 of them answered the questionnaire, which equals a response rate of 67%. Out of them 1592 were included in the analysis. The participation rate in this study was 53.1%. The study group consisted of 53,3% women, which is more than in the Swedish population (50,5%). In comparison to the Swedish population in 2002, (Statistiska centralbyrån) the distribution in the different age groups in the study group was different. The 24 year and younger age group was underrepresented (6,8% in the study group, 8,05% in the Swedish population) while the 45-64 and 25-44 year olds were over represented (40,8% to 25,9% and 37,7% to 27,2%). Even though this study provides data about physical activity levels in a large study sample, due to the reasons stated above, one should be careful when generalising to the Swedish population.

The validity and reliability evaluation showed that the IPAQ instruments have acceptable measurement properties; at least as good as other established self-report instruments. The IPAQ instruments are recommended as a viable method of monitoring population levels of physical activity globally for population 18-69 years of age (Craig CL et al, 2003). However, self reporting physical activity questionnaires are not as accurate in measuring physical activity than objective methods such as accelerometers

or heart rate monitoring, but they are the best choice for conducting large scale epidemiological surveys. Like every other method that assesses physical activity retrospectively, the IPAQ might cause some bias due to problems in recalling activity accurately for the last seven days or estimating duration or frequency. Some studies show the tendency to over report physical activity (Klesges et al.1990, Duncan et al.2001).

Inconsistent answers and no answers in the activity variables were recoded to 0 minutes/week. This might have lead to an underestimation of the total physical activity and to an over estimation of the proportion of sedentary subjects.

The proportion of sedentary subjects in the study group was 23,2%. Sedentarism in this study was defined as less than 150 minutes/week of total HEPA accumulated at work, transportation, household activities and leisure time. Since many other studies focus only on sedentarism during leisure time, the results are difficult to compare. The data from the 1998 Behavioral Risk factor surveillance system (CDC, 2003) in the United States showed that around 30% of the adults were sedentary during leisure time. Data for physical inactivity, defined as not participating in any leisure time physical activity in the European union varied from 8,1% for Finland to 59,3% in Portugal (Martinez-Gonzales et al, 2001). A Swedish study about trends in physical inactivity during leisure time showed an increase from 14,7 to 18,1% for men and from 19,4% to 26,7% for women between 1986 and 1994 (Lindström et al. 2003). A survey from England showed a prevalence of physical inactivity, which was defined as less than 30 minutes of moderate intensity activity at work and leisure time, of 29% for men and 28% for women. Another study in Sweden, which used IPAQ (Sjöström et al 2002), reported similar results for the proportion of sedentary people. About 10% of men and 20% of women did not reach the recommended amount of 30 minutes of physical activity per day.

In this study the 35-44 age group showed the lowest proportion of physical inactivity and there was no clear relationship between inactivity and age. The classification in age categories in this study differed from other studies because the 25-34 and 35-44 age groups are split in own categories. However, when the 25-34 and the 35-44 year olds were categorized into one group, there was an increase in physical inactivity with increasing age seen. The low values for inactivity in the 35-44 age group might be due

to the high levels of domestic physical activity in women in this age group. One study that categorized age into age groups of 18-34, 35-49 and older than 50 years, reported increasing physical inactivity with age in the Baltic countries (Pomerleau et al. 2000). A Brazilian study, which used the short form IPAQ showed also a positive association with age (Hallal et al. 2003).

The highest proportion of sedentary subjects was seen in higher employees and the lowest in workers. Conversely, increasing levels of activity were reported with increasing income and educational level in the Baltic countries (Pomerleau J et al. 2000). However the study about the Baltic countries was focused on leisure time inactivity.

The median of total HEPA in this study was 490 minutes /week. This equals 70 minutes per day. The median of time spent in moderate and vigorous activity was 51 minutes per day and around 4 minutes per day respectively. Another Swedish study that used the IPAQ (Sjöström et al. 2002) found a mean value of 64 minutes of total activity per day from which 44 minutes were from moderate and 20 minutes were from vigorous activities. Results from the International Prevalence Study, using the short format IPAQ for assessing physical activity, showed median levels of 0 minutes/week for vigorous activity, 120 minutes/week for moderate activity and 150 minutes/week for walking (PrevNut, unpublished data 2004). The European physical activity surveillance system assessed vigorous and moderate physical activity with the short format IPAQ in eight European countries. For all nations the mean for vigorous activity was 281 minutes/week and 318 minutes/week for moderate physical activity (Ruetten et al. 2003).

Most surveys reveal that: (1) men are more active than women; (2) activity levels decline with increasing age; (3) activity levels are consistently higher in those with higher education and income; (4) activity levels are inversely associated with adiposity (U.S. DHHS, 1996).

Consistently with previous findings, men reported higher levels of total physical activity and vigorous activity than women in this study. On the other hand, women reported more moderate activity than men.

There was no decline in total physical activity with increasing age seen in this study. The 35-44 age group reported the highest levels of total HEPA and moderate activity, while the 25-34 age group reported the second lowest levels (after the age group 65 and older). But when the 25-34 and the 35-44 years old were categorized into one group, there a decrease in total HEPA and moderate activity with increasing age could be seen. Most studies that showed decreasing physical activity with increasing age were focused only on leisure time physical activity. Similarly, this study showed decreasing levels of leisure time HEPA as well. One study, which included also physical activity derived from work, walking/cycling and housework on Swedish men observed a systematically decrease in physical activity between age 45 and 79 (Norman et al. 2002).

In this study, socio economic status was categorized by profession. In the whole study group as well as when stratified by gender, the median level of total HEPA was higher in workers than in employees. Other studies showed increasing levels of physical activity with increasing income or increasing level of education (CDC, 2003). This difference might be caused by the fact that most other studies focused only on leisure time physical activity. Similarly to previous findings, the middle and higher employees in this study reported the highest median levels for leisure time HEPA, while the levels for lower employees were lower and the median levels of leisure time HEPA were 0 for workers. Another study on Swedish men aged 45-79, which included also physical activity derived from work, walking/cycling and housework and leisure time, showed that subjects with a lower educational level had higher physical activity than those with higher educational level (Norman et al. 2002).

While other studies reported decreasing levels of physical activity with increasing BMI (Norman et al. 2002), this study did not show any significant differences between BMI groups for total HEPA. The explanation for this difference might be that these studies focused mainly on leisure time activity. Similarly to previous findings, this study showed that leisure time HEPA decreased with increasing BMI and that physical inactivity increased with increasing BMI.

A large part of the total HEPA was accumulated in the domain of domestic HEPA. Women reported significantly more domestic HEPA than men. There are currently no other studies with comparable results for this domain. The 35- 44 age group reported the highest levels of domestic physical activity. These high levels might be due to the

women in this age group who reported the highest levels, while for man the levels were the same from age groups 35-44 to 65 and older.

The domains where the fewest subjects reported any activity, were work and transportation. One third reported HEPA at work, but it is difficult to change activity in this domain. Since only 30.5% of all subjects reported any HEPA during transportation, there might be a great potential for increasing HEPA in this domain by interventions. The advantages of this approach are even better as interventions that focused on physical activity at transportation showed promising results (Oja et al. 1998).

To compare results nationally and internationally more studies exploring total physical levels with a standardized method such as the IPAQ are needed. Further research is needed to investigate the correlates between levels of total physical activity and health outcomes as well as trends in total activity over time.

6.1 Conclusion

Overall, because this study covered more domains than leisure time physical activity, it revealed higher levels of total physical activity than most other studies. Men reported higher levels of total physical activity than women. The 35-44 age group reported the highest levels of total, and domestic physical activity. Most participants reported having physical activity in domestic chores (74.2%) and leisure time (55.2%). One third reported HEPA at work, but it is difficult to change activity in this domain. Since only 30.5% of all subjects reported any HEPA during transportation, there might be a great potential for increasing HEPA in this domain by interventions.

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KAROLINSKA INSTITUTET
Institutionen för biovetenskaper
Enheten för preventiv näringslära

Etikett

ABC – Enkät om kost och aktivitetsvanor

Enkäten är uppdelad i tre delar där den första handlar om bakgrundsfakta, den andra om rörelsevanor och den tredje om frukt och grönsaker.

Uppgifterna du lämnar i enkäten är helt konfidentiella och kommer inte att kunna sammankopplas med dig personligen.

Läs noga igenom de anvisningar som finns till de enskilda frågorna och besvara dem i tur och ordning.

Enkäten skickar du sedan tillbaka till oss i bifogat svarskuvert.

DEL I: BAKGRUND

1. Vilket år är du född?

Födelseår: 19 ___ ___

2. Är du …
☐ man
☐ kvinna

3. Längd _____cm

Vikt _____ kg

4a. Är du född i Sverige?
☐ Ja
☐ Nej, jag är född i _____

b. Är din mamma född i Sverige?
☐ Ja
☐ Nej, hon är född i _____

c. Är din pappa född i Sverige?
☐ Ja
☐ Nej, han är född i _____

5. Civilstånd
☐ Ensamstående
☐ Sammanboende/Gift
☐ Ensamstående med barn
☐ Bor med föräldrar

Om du är sammanboende/gift:
Arbetar din make/maka/sambo?
☐ Ja, heltid
☐ Ja, deltid
☐ Nej

6. Hur många personer ingår i ditt hushåll/familj?
(räkna även med dig själv, men inte eventuella inneboende)

_____ personer

7. Hur många personer finns i varje åldersgrupp i hushållet?

____ 0-14
____ 15-24
____ 25-44
____ 45-64
____ 65-74
____ 75 år och äldre

8. Vilken är din högsta genomförda skolutbildning?
(räkna ej enstaka kurser)

☐ Folkskola/grundskola eller liknande
☐ 2-årigt gymnasium, realskola, eller liknande
☐ Minst 3-årigt gymnasium eller liknande
☐ Högskola/Universitet
☐ Annat_____

9. Vilken är din huvudsakliga sysselsättning just nu?

☐ I arbete
- ☐ fast anställd
- ☐ egen företagare
- ☐ timanställd
- ☐ projektanställd
- ☐ vikarie
- ☐ deltidsanställd Hur stor andel?_____ %

☐ Tjänstledig från arbetet Hur stor andel?_____ %

☐ Arbetslös
- ☐ helt arbetslös
- ☐ i arbetsmarknadsåtgärder

☐ Pensionär
- ☐ ålderspensionär
- ☐ förtidspensionär/sjukpensionär
- ☐ deltidspensionär
- ☐ avtalspensionär ☐ Annat _____

10. Vilket är ditt yrke/din befattning? (Om du inte förvärvsarbetar nu vill vi att du anger yrke/sysselsättning som du tidigare huvudsakligen haft)
OBS! Undvik allmänna yrkesbeteckningar som *lärare, snickare eller tjänsteman.* Skriv istället *högstadielärare, byggnadssnickare och kontorist.*

_____

11. Hur stor var din personliga inkomst föregående år samt hushållets totala inkomst? (Ange all inkomst före skatt och avdrag. Studiemedel, bidrag, räntor och pensioner räknas som inkomst)

Egen inkomst:

- ☐ mindre än 50.000 kr
- ☐ 50.000-100.000 kr
- ☐ 100.000-150.000 kr
- ☐ 150.000-200.000 kr
- ☐ 200.000-250.000 kr
- ☐ 250.000-300.000 kr
- ☐ 300.000-350.000 kr
- ☐ över 350.000 kr

Maka/ make/ sambos inkomst:

- ☐ mindre än 50.000 kr
- ☐ 50.000-100.000 kr
- ☐ 100.000-150.000 kr
- ☐ 150.000-200.000 kr
- ☐ 200.000-250.000 kr
- ☐ 250.000-300.000 kr
- ☐ 300.000-350.000 kr
- ☐ över 350.000 kr

12. Hur anser du att ditt hälsotillstånd är idag?

- ☐ Utmärkt
- ☐ Mycket bra
- ☐ Bra
- ☐ Någorlunda
- ☐ Dåligt

13. Har en läkare någonsin meddelat dig att du har:

- ☐ Högt blodtryck
- ☐ Reumatism
- ☐ Emfysem
- ☐ Artrit (eller annan ledsjukdom)
- ☐ Hjärtsjukdom
- ☐ Gallbesvär
- ☐ Tumörsjukdomar
- ☐ Gluten/laktosintolerans/matallergi
- ☐ Mag./tarmsjukdom
- ☐ Övervikt
- ☐ Diabetes
- ☐ Inget av ovanstående

14. Är du rökare?

- ☐ Nej jag har aldrig rökt
- ☐ Nej jag röker inte nu, jag har slutat det senaste året
- ☐ Nej jag röker inte nu, jag har slutat för mer än ett år sedan
- ☐ Ja jag röker regelbundet (mer än en cigarett per dag)
- ☐ Ja jag röker ibland (mindre än en cigarett per dag)

15. Hur mycket motion får du på din fritid?

Vilket av följande alternativ passar bäst in på dig?

☐ Får praktiskt taget ingen motion alls
☐ Motionerar då och då
☐ Motionerar regelbundet ungefär en gång i veckan
☐ Motionerar regelbundet ungefär två gånger i veckan
☐ Motionerar regelbundet ganska kraftigt minst två gånger i veckan

16. Vilket av följande påståenden stämmer bäst in på hur du upplever din nuvarande nivå av fysisk aktivitet/motion?

Jag är …

☐ inte särskilt fysiskt aktiv och jag planerar inte att öka min nuvarande nivå
☐ inte särskilt fysiskt aktiv, men jag har tänkt att öka min aktivitet
☐ inte särskilt fysiskt aktiv, men jag har bestämt mig för att öka min aktivitet
☐ fysiskt aktiv/motionär, men har endast varit det de senaste 6 månaderna
☐ fysiskt aktiv/motionär och har varit det längre än 6 månader tillbaka
☐ jag brukade vara fysiskt aktiv, men har de senaste månaderna varit mindre aktiv
☐ vet ej

17. Det finns många olika anledningar till att vara fysiskt aktiv/motionera, vilka av följande påståenden stämmer bäst in på dig. <u>Ange TVÅ alternativ.</u>

Jag är fysiskt aktiv/motionerar för att …

☐ lösa upp spänningar/slappna av
☐ få vara utomhus
☐ upprätthålla en god hälsa
☐ umgås med andra människor
☐ gå ner i vikt/behålla vikten
☐ ha roligt, uppleva äventyr, spänning
☐ känna mig välträngad/ komma i form
☐ uppnå känsla av tillfredsställelse
☐ tillfredsställa tävlingslusten
☐ kunna arbeta hårdare/ förbättra koncentrationsförmågan

☐ annat nämligen _____

☐ är inte fysiskt aktiv/motionerar inte

18. Många olika faktorer kan upplevas som hinder för att vara fysiskt aktiv. Vilka alternativ, om några, upplever du som de största hindren för att vara fysiskt aktiv/motionera. <u>Ange TVÅ alternativ.</u>

☐ är inte den sportiga typen
☐ se efter barn eller äldre släktingar
☐ för blyg eller osäker
☐ ingen att motionera med
☐ hälsan är inte tillräckligt bra
☐ arbete/studier tar för mycket tid
☐ har inte energin, orkar inte
☐ saknar möjligheter till motion där jag bor
☐ rädd för skador
☐ för gammal
☐ föredrar andra aktiviteter, läsa, se på TV, datorn eller liknande
☐ motion är slöseri med tid
☐ har inte råd
☐ behöver inte mer motion

☐ annat nämligen _____

☐ jag upplever inga hinder för att vara fysiskt aktiv/motionera

19. Hur väl stämmer följande påstående angående fysisk aktivitet/motion enligt dig? (Svara på alla påståenden genom att ringa in det alternativ som stämmer bäst in på dig)

	Stämmer definitivt	Stämmer	Stämmer delvis	Stämmer inte	Stämmer inte alls
Området där jag bor erbjuder många möjligheter till att vara fysiskt aktiv/motionera	5	4	3	2	1
Lokala idrottsklubbar och föreningar i närområdet erbjuder många möjligheter till att vara fysiskt aktiv/motionera	5	4	3	2	1
Min kommun gör tillräckligt för att invånarna skall kunna vara fysiskt aktiva/motionera	5	4	3	2	1

20. Hur väl stämmer följande påstående in på dig? (Svara på alla påståenden genom att ringa in det alternativ som stämmer bäst in på dig)

Jag motiveras att vara fysiskt aktiv/motionera av …

	Stämmer Definitivt	Stämmer	Stämmer delvis	Stämmer inte	Stämmer inte alls
min familj och/eller mina vänner	5	4	3	2	1
media, tidningar, TV, radio eller nyheter	5	4	3	2	1
lokala myndigheter/politiker	5	4	3	2	1
vårdpersonal (läkare, friskvård)	5	4	3	2	1
mitt arbete eller skola	5	4	3	2	1

21. Vilket av följande påståenden stämmer bäst in på din konsumtion av frukt och grönsaker?

Jag …

☐ äter inte mycket frukt och grönsaker och planerar inte att öka min konsumtion
☐ äter inte mycket frukt och grönsaker men har tänkt att öka min konsumtion
☐ äter inte mycket frukt och grönsaker men har bestämt mig för att öka min konsumtion
☐ äter mycket frukt och grönsaker men har bara gjort det under de senaste 6 månaderna
☐ äter mycket frukt och grönsaker och har gjort det mer än 6 månader
☐ brukade äta mycket frukt och grönsaker men har under de senaste månaderna ätit mindre
☐ vet ej

22. Många olika faktorer kan upplevas som hinder för att äta frukt och grönsaker. Vilka alternativ, om några, upplever du som de största hindren för att äta frukt och grönsaker. <u>Ange TVÅ alternativ.</u>

☐ för dyrt
☐ dåligt utbud i affär där jag handlar
☐ känner inte till olika frukter och grönsaker
☐ tycker inte om frukt
☐ tycker inte om grönsaker
☐ blir inte mätt av frukt och grönsaker
☐ det är inte ”riktig” mat
☐ finns inte där jag normalt äter
☐ finns inte på jobbet/i skolan
☐ annat nämligen _____

☐ jag upplever inga hinder för att äta frukt och grönsaker

23. Hur väl stämmer följande påstående in på dig? (Svara på alla påståenden genom att ringa in det påstående som stämmer bäst in på dig)

Jag motiveras att äta frukt och grönsaker av …

	Stämmer definitivt	Stämmer	Stämmer delvis	Stämmer inte	Stämmer inte alls
min familj och/eller mina vänner	5	4	3	2	1
media, tidningar, TV, radio eller nyheter	5	4	3	2	1
lokala myndigheter/Politiker	5	4	3	2	1
vårdpersonal (läkare, friskvård)	5	4	3	2	1
mitt arbete eller skola	5	4	3	2	1

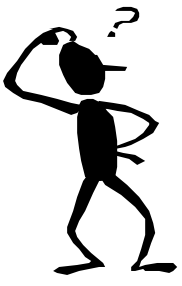
24. Känner du till kampanjen ”Sätt Sverige i rörelse 2001” ?
☐ Ja
☐ Nej

25. Om ja, har denna kampanj påverkat dig att ändra dina vanor?
☐ Ja
☐ Nej

26. Känner du till kampanjen ”Grönt är skönt”
☐ Ja
☐ Nej

27. Om ja, har denna kampanj påverkat dig att ändra dina vanor?
☐ Ja
☐ Nej

Detta var den sista frågan i första delen. Del II innehåller frågor om hur du vanligtvis rör dig i vardagen.



OBS!

Läs noga igenom instruktioner och exempel innan du svarar på frågor i del II och III.

DEL II: AKTIVITETSVANOR

I frågorna används olika begrepp för att beskriva fysisk aktivitet:

- Med **mycket ansträngande** fysisk aktivitet menas aktiviteter som känns mycket arbetsamma och får din andning att kännas mycket tyngre än normalt.

- Med **något ansträngande** fysisk aktivitet menas aktiviteter som känns något arbetsamma och får din andning att kännas något tyngre än normalt

1: ARBETSRELATERAD FYSISK AKTIVITET

Den här första delen handlar om arbete. Detta innefattar betalt arbete och studier. Det innefattar **inte** vardagsgöromål som hem- och trädgårdsarbete, eller att ta hand om familjen. Frågor om detta kommer i 3: Hem och familjearbete.

1a. Har Du för närvarande ett arbete/bedriver studier?

☐ Ja
☐ Nej (Gå till *2:Fysisk aktivitet vid transporter*)

Följande frågor behandlar all fysisk aktivitet som Du utfört under de senaste 7 dagarna som en del av Ditt arbete eller Dina studier. Det innefattar **inte** transporter till och från arbetsplatsen/skolan. När Du svarar på frågorna är det endast aktiviteter **som pågått minst 10 minuter** som är av intresse.

1b. Under hur många av de senaste 7 dagarna har Du utfört **mycket ansträngande** fysisk aktivitet som tunga lyft, tungt trädgårdsarbete, tungt byggarbete, burit stora paket, gått i trappor eller utfört annat tungt kroppsarbete *som en del av Ditt arbete/Dina studier?*

_____Dagar

☐ Inga dagar (*Gå till fråga 1d*)

1c. Hur mycket tid per dag spenderade Du i genomsnitt på **mycket ansträngande** fysisk aktivitet *som en del av Ditt arbete/Dina studier?*

_____Timmar _____Minuter

1d. Under hur många av de senaste 7 dagarna har Du utfört **något ansträngande** fysisk aktivitet som något tunga lyft eller kroppsarbete *som en del av Ditt arbete/Dina studier?*

_____Dagar

☐ Inga dagar (*Gå till fråga 1f*)

1e. Hur mycket tid per dag spenderade Du i genomsnitt på **något ansträngande** fysisk aktivitet *som en del av Ditt arbete/Dina studier?*

_____Timmar _____Minuter

1f. Under hur många av de senaste 7 dagarna har Du **gått eller promenerat** sammanhängande i minst 10 minuter *som en del av Ditt arbete/Dina studier?*

_____Dagar

☐ Inga dagar (*Gå till 2: Fysisk aktivitet vid transporter*)

1g. Hur mycket tid per dag spenderade Du i genomsnitt på **att gå eller promenera**?

_____Timmar _____Minuter

1h. När Du gick eller promenerade *som en del av Ditt arbete/Dina studier*, i vilket tempo gick Du under större delen av tiden?

☐ I ett **mycket ansträngande** tempo, som fick Dig att andas mycket tyngre än normalt
☐ I ett **något ansträngande** tempo , som fick Dig att andas något tyngre än normalt
☐ I ett tempo där Du andades normalt

2: FYSISK AKTIVITET VID TRANSPORTER

Denna del handlar om hur Du vanligtvis transporterar Dig. Det gäller resor till och från arbete och skola men även resor på din fritid som till affären, bio eller träning.

2a. Under hur många av de senaste 7 dagarna har Du rest med motorfordon som tåg, buss, bil, motorcykel, spårvagn eller liknande?

_____Dagar

☐ Inga dagar (*Gå till fråga 2c*)

2b. Hur mycket tid per dag spenderade Du i genomsnitt på transporter med motorfordon?

_____Timmar _____Minuter

I den här delen skall Du besvara frågor som rör transporter med **cykel** eller **till fots**. Det gäller resor till och från arbete och skola men även resor på din fritid som till affären, bio eller träning.

2c. Under hur många av de senaste 7 dagarna har du **cyklat** sammanhängande i minst 10 minuter för att transportera Dig från ett ställe till ett annat?

_____Dagar

☐ Inga dagar (*Gå till fråga 2f*)

2d. Hur mycket tid per dag spenderade Du i genomsnitt på transporter med cykel?

_____Timmar _____Minuter

2e. I vilket tempo cyklade Du under större delen av tiden?

☐ I ett **mycket ansträngande** tempo, som fick Dig att andas mycket tyngre än normalt
☐ I ett **något ansträngande** tempo , som fick Dig att andas något tyngre än normalt
☐ I ett tempo där Du andades normalt

2f. Under hur många av de senaste 7 dagarna har du **gått eller promenerat** sammanhängande i minst 10 minuter för att transportera Dig från ett ställe till ett annat?

_____Dagar

☐ Inga dagar (*Gå till 3: Hem och Familjearbete*)

2g. Hur mycket tid per dag spenderade Du i genomsnitt på transporter till fots?

_____Timmar _____Minuter

2h. I vilket tempo gick Du under större delen av tiden?

☐ I ett **mycket ansträngande** tempo, som fick Dig att andas mycket tyngre än normalt
☐ I ett **något ansträngande** tempo , som fick Dig att andas något tyngre än normalt
☐ I ett tempo där Du andades normalt

3: HEM OCH FAMILJEARBETE

Den här delen handlar om den fysiska aktivitet som Du under de senaste 7 dagarna har utfört i eller i anslutning till Ditt hem. Det kan vara hushålls- och trädgårdsarbete, underhållsarbete i hemmet eller att ta hand om familjen. När Du svarar på frågorna är det endast aktiviteter **som pågått minst 10 minuter** som är av intresse.

3a. Under hur många av de senaste 7 dagarna har Du utfört **mycket ansträngande** fysisk aktivitet som tunga lyft, hugga ved, gräva, skotta snö eller annat mycket ansträngande kroppsarbete *i Din trädgård eller på Din gård?*

_____Dagar

☐ Inga dagar (*Gå till fråga 3c)*

3b. Hur mycket tid per dag spenderade Du i genomsnitt på **mycket ansträngande** fysisk aktivitet i *Din trädgård eller på Din gård?*

_____Timmar _____Minuter

3c. Under hur många av de senaste 7 dagarna har Du utfört **något ansträngande** fysisk aktivitet som att borsta, räfsa, tvätta och vaxa bilen eller utfört annat något ansträngande kroppsarbete i *Din trädgård eller på Din gård?*

_____Dagar

☐ Inga dagar (*Gå till fråga 3e)*

3d. Hur mycket tid per dag spenderade Du i genomsnitt på **något ansträngande** fysisk aktivitet i *Din trädgård eller på Din gård?*

_____Timmar _____Minuter

3e. Under hur många av de senaste 7 dagarna har Du utfört **något ansträngande** fysisk aktivitet som att handtvätta, skura golvet, tvätta fönster eller underhållsarbete *i Ditt hem?*

_____Dagar

☐ Inga dagar (*Gå till 4: Fysisk Aktivitet vid Fritid, Rekreation och Sport)*

3f. Hur mycket tid per dag spenderade Du i genomsnitt på **något ansträngande** fysisk aktivitet *i Ditt hem?*

_____Timmar _____Minuter

4: FYSISK AKTIVITET VID FRITID, REKREATION OCH SPORT

Den här delen handlar om den fysiska aktivitet som Du utövat under de senaste 7 dagarna i samband med fritid, rekreation, motion, sport och träning. När Du svarar på frågorna är det endast aktiviteter **som pågått minst 10 minuter** som är av intresse. Tänk på att **inte** ta med några aktiviteter som Du rapporterat tidigare.

4a. Om Du bortser från all den gång och promenader som Du rapporterat vid tidigare frågor, under hur många dagar under de senaste 7 dagarna har Du gått eller promenerat sammanhängande i minst 10 minuter *på din fritid?*

_____Dagar

☐ Inga dagar (*Gå till fråga 4d)*

4b. Hur mycket tid per dag spenderade Du i genomsnitt på att gå eller promenera *på din fritid?*

_____Timmar _____Minuter

4c. När Du gick eller promenerade på Din fritid, i vilket tempo gick Du under större delen av tiden?

☐ I ett **mycket ansträngande** tempo, som fick Dig att andas mycket tyngre än normalt
☐ I ett **något ansträngande** tempo , som fick Dig att andas något tyngre än normalt
☐ I ett tempo där Du andades normalt

4d. Under hur många dagar under de senaste 7 dagarna har Du utövat **mycket ansträngande** fysisk aktivitet som aerobics, ansträngande cykling eller simning, löpning eller aktiviteter där löpning ingår som exempelvis fotboll *på Din fritid?*

_____Dagar

☐ Inga dagar (*Gå till fråga 4f)*

4e. Under en av dessa dagar, hur mycket tid spenderade Du i genomsnitt på **mycket ansträngande** fysisk aktivitet som aerobics, ansträngande cykling eller simning, löpning eller aktiviteter där löpning ingår som exempelvis fotboll under *Din fritid?*

_____Timmar _____Minuter

4f. Under hur många av de senaste 7 dagarna har Du utfört **något ansträngande** fysisk aktivitet som att cykla, simma eller motionera *på Din fritid?*

_____Dagar

☐ Inga dagar (*Gå till 5: Tid Spenderad Sittande)*

4g. Hur mycket tid spenderade Du i genomsnitt på **något ansträngande** fysisk aktivitet som cykling, simning eller motion under *Din fritid?*

_____Timmar _____Minuter

5: TID SPENDERAD SITTANDE

Den sista frågan handlar om den tid som Du sitter varje dag. Det kan vara på jobbet, i skolan eller under din fritid. Det inkluderar tid sittande vid arbetsplats, hos vänner, vid måltider, när du läser och när du sitter eller ligger och tittar på TV. Du skall **inte** ta med tid som Du rapporterat i samband med transporter i motorfordon.

5a. Hur mycket tid har Du i genomsnitt spenderat sittande under en **veckodag** de 7 senaste dagarna?

_____Timmar _____Minuter

5b. Hur mycket tid har Du i genomsnitt spenderat sittande under en **helgdag** de 7 senaste dagarna?

_____Timmar _____Minuter

Tänk nu igenom samtliga svar som Du givit på de tidigare frågorna om fysisk aktivitet.

6. Hur skulle Du bedöma Din totala omfattning av fysisk aktivitet under de senaste sju dagarna jämfört med vad Du upplever som en "vanlig" vecka (ange ett alternativ).

☐ Jag var mycket mera aktiv under de senaste 7 dagarna
☐ Jag var något mera aktiv under de senaste 7 dagarna
☐ Jag var ungefär lika aktiv under de senaste 7 dagarna
☐ Jag var något mindre aktiv under de senaste 7 dagarna
☐ Jag var mycket mindre aktiv under de senaste 7 dagarna

Nu är Du klar med andra delen. Den tredje och sista delen handlar om hur mycket frukt och grönsaker Du vanligtvis äter.

Eidesstattliche Erklärung

Ich versichere, daß ich die vorliegende Arbeit ohne fremde Hilfe selbständig verfasst und nur die angegebenen Hilfsmittel benutzt habe. Wörtliche oder dem Sinn nach aus anderen Werken entnommene Stellen sind unter Angabe der Quelle kenntlich gemacht.