Predicting Health Behaviour – Population-Based Studies of Knowledge and Behaviour Related to Cardiovascular Diseases

PER ANDERSSON
Dissertation presented at Uppsala University to be publicly examined in Alfa, Mälardalens Högskola, Högskoleplan 1, Västerås, Saturday, November 18, 2006 at 13:15 for the degree of Doctor of Philosophy (Faculty of Medicine). The examination will be conducted in Swedish.

Abstract

The overall aim was to study factors that affect behaviour related to CVD (cardiovascular diseases). Study I tested whether gender, education and socio-economic status correlated to knowledge about risk factors, and Study II studied knowledge and risk behaviour from a national perspective (Sweden versus Poland). Furthermore, Study III examined whether obese people differed from people of normal weight regarding knowledge about risk factors, and Study IV examined whether risk behaviour is affected by personal experience of illness and family history of CVD.

The studies are population-based with cross-sectional design. Data were obtained by questionnaires and by screening results of risk factors related to CVD. The studies were carried out among 50-year old men and women in Västmanland, Sweden (n=1011) and in Wroclaw, Poland (n=1043).

The results show that women are more knowledgeable than men about the risk factors for CVD, and that low education is associated with insufficient knowledge about CVD (Study I). The discrepancy between knowledge and behaviour was greater among the Poles than it was among the Swedes (Study II). Obese individuals did not differ significantly from individuals with a normal weight regarding knowledge of cardiovascular risk factors when education was controlled for (Study III). Individuals with a personal experience of illness may be more inclined to change smoking behaviour than the average person (Study IV).

In conclusion, knowledge about risk factors for CVD varies with education, gender and, to a certain degree, nationality. However, knowledge does not only consist of the conditions of behaviour change. The results in the thesis substantiate theories suggesting that change in risk behaviour is a process over time. Predictors of risk behaviours on the individual level as well as national level are of importance, and needs to be considered in the everyday practice of health care professionals.

Keywords: Population-based study, knowledge about risk factors, CVD, predicting behaviour, family history, experience of illness, obesity, comparison Sweden - Poland, stage of change, health belief model

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List of papers

This thesis is based on the following papers, referred to by their Roman numerals:


IV  Andersson P, Sjöberg RL, Öhrvik J, Leppert J. Effects of family history and personal experience of illness on inclination to change health related behavior. Submitted

Papers I, II and III are reprinted with permission of the publishers.
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This glossary is primarily based on definitions taken from the Scientific Dictionary of Public Health (1).

Bias  Systematic distortion of the estimated intervention effect away from the “truth”, caused by inadequacies in the design, conduct, or analysis of a trial (2).

Cross-sectional study  A study that examines the relationship between diseases, or other health-related characteristics, and other variables of interest, as they exist in a defined population at one particular time.

Confidence interval (CI)  A measure of the precision of an estimated value. The interval represents the range of values, consistent with the data that is believed to encompass the “true” value with high probability (usually 95 %) (2).

Confounding  Mixing of more than one effect. A confounding factor is one that is associated with the studied exposure, while at the same time being a risk factor for the dependent outcome variable.

Factor analysis  A statistical approach to reduce the number of variables in an analysis on the basis of their associations to each other. Can be used to study the extent to which one, or several, variables are expressions of the same underlying phenomena.

Generalise  To make conclusions from one or several separate phenomena to something general by distinguishing their special characteristics and identifying what they have in common.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Health behaviour</td>
<td>Any activity undertaken by those believing themselves to be healthy for the purpose of preventing or detecting disease at an asymptomatic stage (3).</td>
</tr>
<tr>
<td>Interaction</td>
<td>Interplay. Refers to the joint operation of two or more causes to produce a different effect than just the sum of the separate effect.</td>
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<tr>
<td>Knowledge</td>
<td>In this thesis, knowledge refers primarily to awareness of the factors that increase or decrease the risk of cardiovascular disease.</td>
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<tr>
<td>Logistic regression</td>
<td>A regression analysis where the association between two or more quantitative variables is a function of the included determinants.</td>
</tr>
<tr>
<td>Obesity</td>
<td>BMI $\geq$ 30.00 kg/m$^2$ (4)</td>
</tr>
<tr>
<td>Odds ratio</td>
<td>The ratio between two odds. The odds of a particular exposure among persons with specific characteristics divided by the corresponding odds of exposure among persons without the same specific characteristics.</td>
</tr>
<tr>
<td>Overweight</td>
<td>BMI 25.00-29.99 kg/m$^2$ (4)</td>
</tr>
<tr>
<td>Predictor</td>
<td>A variable that can foretell something about future events.</td>
</tr>
<tr>
<td>Prevention</td>
<td>Measures to prevent occurrence of disease or to arrest its progress and reduce its consequences once it is established. Primary prevention seeks to prevent the initial occurrence of a disease. Secondary prevention seeks to arrest or retard existing disease through early detection.</td>
</tr>
<tr>
<td>Risk behaviour</td>
<td>Specific forms of behaviour which are proven to be associated with increased susceptibility to a specific injury, disease or ill health.</td>
</tr>
<tr>
<td>Risk factor</td>
<td>An individual’s characteristics indicating an increased risk of ill health, disease, injury or adverse health behaviour. This characteristic can be related to any aspect of an individual (hereditary, social, economic or environmental). Risk factors precede the phenomenon that they are indicating. A risk factor can be either congenital or acquired.</td>
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<tr>
<td>Validity</td>
<td>The ability of the study to capture what was stated in the aims</td>
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</table>
Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>CVD</td>
<td>Cardiovascular Diseases</td>
</tr>
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<td>CHD</td>
<td>Coronary Heart Diseases</td>
</tr>
<tr>
<td>SOC</td>
<td>Stage Of Change</td>
</tr>
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<td>HBM</td>
<td>Health Belief Model</td>
</tr>
<tr>
<td>SES</td>
<td>Socio-Economic Status</td>
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<tr>
<td>SEI</td>
<td>Socio-Economic Index</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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He lives a dangerous life, is 48 years old, overweight, stressed and untrained. The fact that he is on medication for high blood pressure and feels a pressure over his chest when he goes up and down the stairs does not make the situation better. There are obvious signs that something is wrong and that he should see a doctor.

But it is difficult to break old habits and it is not the easiest thing to convince him that he has a problem. What should the health professional do to make him understand how serious his situation is? One traditional way is to let him read about risk factors and illness. Another possibility would be to have a discussion with him and to learn more about his own understanding of the situation. One goal would be to make him understand that his lifestyle is unhealthy and that he needs to do something radical to avoid the risk of having a heart attack. But if he listens to you, what happens then? What does it mean to understand?

While working as a nurse in both the medical emergency and primary health care settings I was frequently confronted with the health promotion challenges these patients pose. As a lecturer in nursing education, I have also had the opportunity to deal with the very same issues from a theoretical point of view.

These experiences made me appreciate the need for further exploration of the nature and dynamics of predicting the health behaviors of these kinds of patients and writing this thesis has allowed me to do so.
Introduction

Risk factors for cardiovascular diseases

Cardiovascular disease (CVD) is responsible for a considerable proportion of the mortality and morbidity of the general population. Myocardial infarction is the most common cause of death in Sweden and stroke is the third most common. This is much the same for most other countries in Europe (5). In the present thesis CHD (coronary heart disease) is a part of CVD. About 40,000 Swedes will have a myocardial infarction annually, and about 35,000 will have a stroke. According to a current report from the Swedish National Board of Health and Welfare the death rate for CVD continues to fall (6, 7). The survival of more people from CVD means that there will be an increased demand for health care after the event. From a national perspective, there has been a favourable trend regarding CVD in many of the world’s industrial countries, but there are still considerable geographical differences. In some of the Eastern European countries, CVD deaths are still at a very high level (8-10). Development of primary and secondary prevention must thus be considered vital to most European countries.

The most important risk factors for CVD are age, gender, heredity, high blood pressure, high blood lipids, tobacco smoking and physical inactivity (11-16). Hereditary factors constitute important predictors of CVD (11, 17). Close blood relatives are in a high risk group where a high proportion will have the same genetic defects as the patient and, thus, also run the risk of developing the same illness (18-20).

Studies have also shown that stress at work and within the family is associated with an increased risk for CVD (21-25). Low education and low socioeconomic status have a correlation to CVD in both men and women (26-33). Other risk factors for CVD are obesity, diabetes, social vulnerabilities, and insufficiencies in the social network (34-39).

Obesity is the risk factor that has shown the greatest increase in prevalence during the latest decades (40-45). However, at least in Sweden, this increase appears to have tailed off between 2002 and 2004. Despite this, around 10% of the population in the 16-84 year age group, have a BMI-value over 30 (6). Fifteen percent of the men in the 55-64 age group are extremely overweight. A higher proportion of those with a BMI over 30 are
found among those with low level of education and low socioeconomic status. Thus, socioeconomic inequality may increase health consequences of obesity in many countries (46-51).

Prevention of cardiovascular diseases

The aims of taking measures against CVD are to prevent illness from occurring, primary prevention, and to prevent relapse, secondary prevention. Considerable progress has been made in the field of medicine-based prevention (52, 53), but the development has not been as beneficial in relation to people’s lifestyles and habits. The European guidelines on cardiovascular disease prevention in clinical practice focus on both behavioural and biological-related risk factors (54).

Living habits is an important factor in population-focused prevention of CVD. People can feel well, even though they may have developed preliminary stages of illness such as diabetes, dyslipidemia, or increased blood pressure. Another problem concerning prevention that becomes apparent in the screening for risk factors is that the motive to change one’s lifestyle can be weak in an individual who does not have any symptoms of illness (55).

Screening involves an attempt to identify risk factors (56). Traditionally such screening is most often combined with health information and counseling, based on the results found. Screening is usually of the opportunistic type, which means that the opportunity is taken to screen people who attend a health centre for a different reason (57). Another, more systematic, way is to invite all people from various age groups, for example, all 40 and 50 year olds, in order to identify possible risk factors for CVD. In addition, mass screening is a strategy for screening when a whole population is invited for testing (58). It is still unclear which strategy is the most effective (59-63). It is also important to be aware that populations show different reactions when different strategies are applied (64).

A large number of preventive CVD programmes which include screening and health information, have been carried out in different parts of the world. Several of these programmes have combined measures directed at whole populations with opportunistic attempts to discover and treat people with a high risk of becoming ill with CVD. To analyse effects of CVD-programmes with population based strategies it is essential to examine the designs used and how the programmes were implemented (65, 66). When effects of different population-focused projects have been evaluated, differences between intervention and control groups have generally been small with no clear advantages towards the population-focused programmes compared to high-risk strategy programmes (67-71).

In North Karelia, Finland, one of the most famous CVD programmes started in 1972 (72). The main purpose of the program in North Karelia was
to reduce morbidity and mortality levels caused by CVD, with a specific focus on middle-aged men. There was a reduce in deaths from CVD in North Karelia, but this did not differ from the average reduce in deaths in the total population of Finland. The decreasing trend had already begun before the North Karelia project started and it is therefore unclear whether any reliable effects can be attributed to this project (73).

In the USA, a project called the Stanford Three-Community Study was carried out in the 1970s (74, 75). During the two years the study was performed, risk factor levels decreased in both communities where the programme was being carried out, while changes were more limited in the control community. Intervention in the Stanford Three-Community was, primarily, a mass media campaign, where the aim was to increase awareness of the causes of CVD.

In the beginning of the 1980s new programmes, focusing on population strategies rather than risk-oriented components, were started in the USA. A common factor for these programmes was the development of intervention methods with more well-organised ways to spread knowledge. A unique effort was the Stanford Five-City Project where a multilingual venture was used to reach subgroups where language difficulties could be a barrier against understanding health information (70). The Minnesota Heart Health Program combined a large number of strategies though no randomisation was done, which affected the possibilities of making adjustments for the effects of gender and level of education (71). The Pawtucket Heart Health Program included towns with relatively high unemployment and with a large proportion of inhabitants who were low educated. One strategy in the Pawtucket Heart Health Program that contributed to positive effects on the risk factor levels was that health information was adapted for target groups. One example was that people with inadequate reading skills received specially designed programmes (69). A common factor for the American programmes was that consideration was given to the conditions of the individual, partly through the interpretation of results, and partly through the choice of intervention methods.

Since it’s outset in the 1980s, the Swedish Norsjö Project has been regarded as a demonstration project for Public Health Care involvement on a population level. The municipality of Norsjö, with a mainly rural population, had an excessive death rate from CVD (76). During the first two years of the project, 2,400 people participated, from a total of 5,400 inhabitants in the municipality. One of the aims of the Norsjö Project was to make people take personal responsibility for their health (76-78). A conclusion from the Norsjö Project was that a long-term, municipality-based, CVD programme that combines population and individual strategies can prevent CVD among high-risk individuals.

Another Swedish project is the Malmö Preventive Project that involved the screening of risk factors in 33,346 people. One quarter of those who
participated were offered preventive measures for the risks related to CVD and alcohol abuse. The main results of the project was that benefits of screening and prevention on mortality risk could only be shown in certain subgroups of younger men and women, not in the screened cohort, as compared with a non screened reference population (67).

Within the County Council of Västmanland in Sweden, 34,304 health checks were carried out during the years 1990-1999 in a CVD programme aimed at 40- and 50-year olds. The evaluations showed that the proportion of smokers had decreased, in particular, among 40-year old men. However, the proportion of 40- and 50-year olds who seldom, or never, exercised had increased among both men and women. Another problem that emerged during the 10 years of the project was a continual increase in body weight among both the men and the women who were taking part in the health checks (79).

Many other projects containing screening for CVD have been carried out in Sweden, and have shown positive results pertaining to the level of risk factors (68, 80-82). Naturally, the question still arises of how projects and programmes can be more effective, and how greater attention can be given to the requirements of individuals.

An evaluation of a large number of CVD programmes (65), sought to find the extent to which new knowledge, communication, information distribution, and social learning in Public Health Care work, can be used. Some questions emphasised in this report consider what the effects of social groups on society are, and what kinds of interventions that are most beneficial. One other important question is whether different intervention methods increase or decrease social differences? The population-focused strategies result in high risk and low risk individuals being treated in a similar way and a large number of them being subject to “unnecessary” preventive measures (83). Empirical experience furthermore indicates that even though risk factor levels in populations are declining it is specific subgroups that receive the greatest benefit from preventive efforts (67, 84).

It has thus been argued that the population-focused programme approach needs to develop new methods taking knowledge about behavioural and social processes into account (15, 61, 85). From a cognitive perspective, the individual’s knowledge and experience of the threat of illness constitute factors that can possibly explain risk behaviour. Another factor that may contribute to the understanding of an individual’s risk behaviour is the social environment.

Health models
Primary prevention of CVD implies, among other things, the bringing about of behaviour change. Reaching such a goal requires an awareness of how cognitive factors affect behaviour. Knowledge is a cognitive factor and a
logical prerequisite for the intention of bringing about health related behaviour. How type of knowledge and level of knowledge are related to behaviour is important for the understanding of health promotion (86).

A number of cognitive factors within health promotion have been developed into some general dimensions including, for example, perceptions of disease threat, knowledge about disease, social network characteristics and demographic factors (87). These dimensions have, thereafter, been included in a number of theoretical models where the aim is to predict health behaviour and give a structure for how interventions can be carried out (88).

The Health Belief Model (HBM) is one of the most applied models in these contexts. The HBM is based on the assumption that health behaviour is dependent on individuals’ understanding of their own health (89). Perceived vulnerability and perceived obstacles are other factors influencing the ability of individuals to implement action that leads to behaviour change. According to the HBM, the factors contributing to behaviour change are motivation, degree of social support, and knowledge about risk factors. Family history of illness or the need for medical treatment further strengthens the reason for trying to change behaviour (90-93).

Stage of Change (SOC) is another influential model often used to explain health related behaviour. According to this theory health related change is a process with different qualitative stages (94, 95). Prochaska et al identified five of these stages: pre-contemplation, contemplation, preparation, action and maintenance. The individual is, according to the model, more or less susceptible to different types of influence depending on which stage they are in (96). SOC has clear support regarding behaviour change for the individual and the group level, where specific focus has been on the structure for making people quit smoking (97-100), change exercise habits (101-103) or eating habits (104-107).

Factors related to knowledge about risk factors

One way of taking cognitive factors into consideration is to adapt the health information to specific risk groups. For example, earlier studies have shown that risk classification is important (108) and has an impact upon patients’ readiness to change modifiable cardiovascular risk behaviours (109). Evaluations of the effect that an educational program had on CVD prevention knowledge showed that those with a low level of education only marginally increased their CVD knowledge during a 10-year period, while those with a high level of education increased their knowledge (110, 111).

Another important aspect to take into consideration when regarding individual conditions is the discrepancy between the perceived risk of illness and the actual risk of illness (112-118). A longitudinal study (6 year) among 1024 women have shown that the awareness of CVD increases, but at the
same time, the discrepancy remains between perceived and actual risk of illness (119). In an American study, the knowledge about risk factors was less among individuals with increased risk behaviour. Low income and little formal education were other factors that correlated to insufficient knowledge (120). Insufficient information about diseases and a wrong perception of the condition of one’s illness clearly reduced the chances for a healthy behaviour (121-123).

Knowledge and age are sometimes referred to as positive associated phenomena but not when it comes to knowledge about risk factors for CVD. On the contrary, particularly older men have less knowledge about risk factors for CVD (124, 125).

As mentioned above there are both theoretical and practical reasons to believe that experience of illness as well as symptoms of illness may make you more aware of illness related risk factors. In line with this is has been shown that patients who believes themselves to be in generally poor health feel more vulnerable to getting any illness (126), compared to others where the illness symptoms are not as obvious (127). A study of smoking/non smoking CVD patients with elevated blood glucose levels or high blood pressure showed that general knowledge about CVD is not sufficient enough to change risk behaviour (128). The awareness of the individual concerning their state of health may furthermore be an important prerequisite for behaviour change and it is also a tool that can motivate behaviour change.

Obesity related to knowledge and risk behaviour

Obesity is an important risk factor for CVD. It may be influenced by behaviour and it increases the risk for developing a number of other well-known CVD risk factors such as raised blood pressure and elevated cholesterol (34, 38, 43). The fact that obesity is influenced by behaviour may suggest the hypothesis that insufficient knowledge about risk factors for CVD may contribute to obesity. An opposite hypothesis would be that obese individuals because of their condition are even more aware of risk factors for CVD than others.

The Metabolic syndrome is a disease including conditions of obesity, insulin resistance, dyslipidemia, and hypertension (129, 130). According to current theories, metabolic syndrome is caused by poor diet and low physical activity (131, 132). There is a similar correlation between low education and the prevalence of risk factors for CVD and low education and prevalence of metabolic syndrome (133).

This raises the question whether inadequate knowledge may be a contributing factor to obesity. The relation between level of education, obesity, and knowledge about risk factors has, as far as we are aware, only been studied to a limited degree.
Risk behaviour in relation to family history and personal experience of illness.

As noted above, it may from a theoretical point of view be assumed that the experience of being given a diagnosis should lead to the patient developing an interest in obtaining knowledge about the illness and possible ways to avoid complications. Furthermore, doctors and nurses have an interest in providing the patient with information aimed at increasing awareness and changing any elements of risk behaviour. Information and personal interest as well as the actual experience of illness ought to be beneficial factors in the bringing about of more healthy behaviour.

Women with personal experience of illness show higher awareness of the risk factors related to the illness than women without experience of illness (124). Other studies among women have also shown that personal experience of illness leads to more healthy behaviour (91). At the same time, there are opposite results from studies of patients with heart disease where both men and women had difficulties assessing the risk for recurring illness. There are doubts about the extent to which the actual experience of illness predicts behaviour among patients with CVD (134).

Factors pertaining to family history of CVD have been well studied and constitute clear indications of increased risk of illness (18-20). Therefore, this ought to be a tool within primary care prevention for motivating healthy behaviour (135). When a close blood relative is stricken by illness, the personal perception of contracting the illness increases. However, a longitudinal study of 3,590 younger adults (18-30 years old), surprisingly showed opposite results. The study examined whether behaviour changed when a close relative was hit by heart disease. The result showed that this incident did not motivate long-lasting healthy behaviour (136). Relatives of patients with CVD are aware that there is a family history of disease. However, they have a low level of knowledge about the consequences of this risk factor regarding the development of CVD (137-139).

Essential questions in studying this further are whether these factors predict more healthy behaviour and whether family history and personal experience of illness influence behaviour to various extents. Are some of these factors stronger predictors than others?

Influence of different social systems on behaviour and health status.

The influence of social factors on people’s health continues to be a problem in many countries where there is a difference in health between unequal social groups in society (140-142). Another aspect that requires attention is the
health discrepancies between different countries. Concerns are often expressed about differences between rich, developed countries and poorly developed countries (143-145). In a study of a number of countries in the European Union (EU), where the aim was to describe how perceptions of, and attitudes about, risk factors influence health, distinct differences between countries emerged, despite the fact that social and economic conditions were fairly similar (146). Another example of variation in Europe is the difference in life expectancy between countries in Eastern Europe and Western Europe, where the average life span is significantly lower in Eastern Europe (147, 148). Despite this difference in life span, health has improved in Eastern Europe during the last decades, above all through the reduction in the death rate from CVD (148-150). The reduced death rate can be explained by improved diet and a higher quality of medical care, especially concerning high blood pressure (149-151). Another measure taken to improve health conditions in the population of Eastern Europe is the introduction of modern primary health care. The transformation from communism to democracy has also contributed to the improvements in health conditions for the population (152, 153). In Western European countries, with Sweden as an example, health campaigns and different preventive projects have been carried out since the 1970s (76), while similar projects in Poland started about 20 years later (154-156). This time-difference in ongoing preventive projects can be an explanation for the differences in health. Current studies show that gender, age, education, and income, even in Eastern Europe, constitute predictors for risk behaviour that are related to CVD (157-160).

Applying the research to the relation between health and social factors in special social contexts may help us better understand the causal mechanisms. For example, comparing general health in countries with different social systems increases the possibility to better understand why health follows a social gradient (143, 161, 162). An increased understanding of causal mechanisms may in turn lead to more effective health promotion (163).
The overall aim of the thesis was to study factors that influence health-related behaviour.

Specific aims were:

- to determine if certain background factors (e.g. gender, education and socioeconomic status) were associated with an individual’s awareness and knowledge of the risk factors associated with CVD (Paper I).

- to investigate whether knowledge about cardiovascular risk factors, motivation to control risk-related behaviour and actual risk behaviour differed between Poland and Sweden on the basis of information obtained during screening programme (Paper II).

- to investigate whether obese individuals differ from individuals with normal weight regarding knowledge about risk factors for CVD. A further aim was to replicate previous findings that obese individuals are at higher risk of developing other biological risk factors for CVD (Paper III).

- to examine how personal experience of illness and family history of cardiovascular disease (CVD), adjusted for gender, education and nationality, affect risk behaviour (Paper IV).
Methods

Design
The design for the different studies in this thesis consists mainly of population-based cross-sectional studies. In Study I, a population-based cross-sectional study was conducted that focused on 50-year old men and women who participated in a screening of risk factors for CVD within the County Council of Västmanland, Sweden. Participants in this screening answered a questionnaire. In Study II, a comparison study was made of two populations. The participants in Study I formed one population that was compared with a Polish population. The Polish population was recruited from the Wroclaw area and took part in a cardiovascular screening that had the same aim, target group, and organisation, as the Swedish one. The gathering of data in Study II was done by a questionnaire combined with the results from the screening examination. In Study III, a selection of participants was taken from Study I. The BMI-values of the participants were the basis for a comparison study between those with a normal weight (BMI < 25 kg/m²) and people with obesity (BMI ≥ 30 kg/m²). The measurement tool in Study III consisted of questionnaires and screening results from the health examination. Study IV consisted of a pooling of populations from Study II whereby analyses were made within as well as between the subjects. Subgroups comprised of people with, and without, previous experience of illness or a family history of CVD.

Settings
Studies included in this thesis were carried out in connection with the project "Hjärtvänliga Västmanland" in the County Council of Västmanland (79). This programme was started in 1990 as a 10-year programme to reduce the death rate for CVD. During this 10-year period, the County Council of Västmanland began to cooperate with the Health Care system in Wroclaw, Poland. In 1998, the cardiovascular programme began in Wroclaw and is currently a permanent part of primary health care.
Data gathering for the studies included in this thesis took place partly in health centres in the County Council of Västmanland, Sweden, and partly in health centres in Wroclaw, Poland. The County Council of Västmanland, with a population of around 260,000 inhabitants, is mainly industrialised and has a certain extent of forestry and farming. Västmanland does not differ demographically from the other counties in this part of central Sweden (164).

Wroclaw is a town in Poland with around 640,000 inhabitants situated in the South-Western part of the country, in a region called Lower Silesia. The area around Wroclaw is industrialised and one of the country’s biggest universities is situated in the actual town.

Population
Study I
A total of 36 Health Centres within the County Council of Västmanland were invited to participate in the health examination, and 34 Health Centres accepted the invitation. During the year that the data was gathered, there were 3,345 men and women of age 50 in the population register of Västmanland. Of these 3,345 people, a total of 1,981 took part in the health examination, distributed over 34 Health Centres. Data was gathered between May 1997 and April 1998. During this time 1,129 people were examined, and the remainders were invited before or after this time period. One thousand eleven of these 1,129 people completed questionnaires (554 women and 457 men). In Study I, individuals from various professional backgrounds were classified according to a socio-economic index (SEI) (165). Participants with university degree were allocated to SEI I (high socioeconomic status (SES) (n = 314, 31 %)), lower and middle civil servants were classified into SEI II (middle SES) (n = 167, 17 %) and workers were assigned to SEI III (low SES) (n = 433, 43 %); house worker, pensioners, self-employed and farmer (n =89, 7 %). Education was divided into three categories: low education (compulsory school/primary school) (n = 552, 54 %), medium education (completion of gymnasium/secondary school) (n = 229, 23 %) and high education (university studies) (n = 230, 23 %).

Study II
In Study II, the Swedish population from Study I was included with the Polish population from Wroclaw in Poland. In Wroclaw there are 89 Health Centres of differing sizes with varying types of organisation. Data from Wroclaw was gathered during year 2000 and 10 Health Centres were involved in the health examinations. Two thousand two hundred five men and
women, age 50, were registered at these health centres. Data was gathered from October to December 2000, and during this time 1,043 persons participated in health examinations. One thousand twenty of these 1,043 completed the questionnaire. Of these 1020 people 76 did not answered questions about educational level. See Table I.

Table I. Demographic data.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Poland n=1020</th>
<th>Sweden n=1011</th>
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<tbody>
<tr>
<td>Male</td>
<td>406</td>
<td>457</td>
</tr>
<tr>
<td>Female</td>
<td>614</td>
<td>554</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highly educated (&gt;12 years)</td>
<td>289</td>
<td>230</td>
</tr>
<tr>
<td>Low education (≤12 years)</td>
<td>655</td>
<td>781</td>
</tr>
</tbody>
</table>

Study III

Study III comprised of a selection of two subgroups from the Swedish population in Study I. The BMI-values registered at the screening constituted the inclusion criteria. One group with 385 people comprised of those who had a normal weight (BMI < 25 kg/m²). They were compared with a group of 159 people who were obese (BMI ≥ 30 kg/m²).

Study IV

The population of Study IV consisted of both Swedish (Study I) and Polish (Study II) participants, all of them underwent screening for CVD. A total of 2,054 men and women of 50-years of age were included in Study IV, with 1,011 people from the Swedish population and 1,043 from the Polish population.

Procedure

Within the cardiovascular programme in the County Council of Västmanland all 50-year olds that were registered at a family doctor were invited to participate in a screening of risk factors for CVD. A District Nurse sent information and a questionnaire to those who accepted the invitation. The infor-
...ation applied to the health examination, and the questionnaire contained questions about living habits (e.g. eating habits, exercise and smoking). During the screening examination a number of tests were carried out to identify risk factors. This model for screening was developed in the County Council of Västmanland, Sweden, and followed the same pattern during the year the programme lasted. The procedures for the invitation, screening examination, and health talk were administered in a similar way in Wroclaw, Poland. In Wroclaw, persons belong to the Health Centre that is geographically closest to their residential address.

Before the screening examination and health talk at the Health Centre, all the study participants were asked to complete a questionnaire pertaining to knowledge about risk factors for CVD.

Measurements

Screening

A standardised form was used for the screening of risk factors (see Appendix). The form contained questions about age, gender, number of people in the household, years of education, and employment. One part of the form contained questions about earlier illness such as diabetes, high blood pressure, myocardial infarction, angina pectoris and stroke. Two questions focused on family history whereby people stated whether their parents had become ill or died from CVD before the age of 55. Self reported living habits pertained to smoking and exercise. Smoking habits were classified into five groups (have never smoked, smoked but have stopped, smoke 1-15 cig/day, smoke 14-25 cig/day, smoke > 25 cig/day). Exercise habits were assessed on the basis of a self-assessed, five-grade scale (exercising daily, exercising 3-4 times/week, exercising 1-2 times/week, exercising 1-2 times/month, exercising rarely or never). Exercising was considered to be some form of physically strenuous activity such as walking or gardening for at least 30 minutes.

The physiological measurements taken were blood pressure, total cholesterol and fasted blood glucose in capillary blood, weight, height, and waist and hip circumferences. Weight and height measurements became the starting point for the calculation of BMI. These measurements were taken by nurses or laboratory personnel at the respective health centres. Total blood cholesterol concentrations were measured by the enzymatic dry method. For this purpose, we used the Reflotron system (Roche Diagnostic, Switzerland), standardised according to the manufacturer's instructions and carefully calibrated to the method used at the laboratory in the Central Hospital, Västerås (166). The individuals were recommended to fast and avoid smoking for at
least two hours before the screening. Fasting blood glucose concentration was analysed with a factory-calibrated photometer from the Swedish company, Hemocue (Hemocue AB, Ängelholm, Sweden).

In Study II, smoking habits were classified into three categories (never smoked, smoked but have stopped, and smoker), and exercising habits were classified according to the original five-grade scale.

In Study III, a selection was made from the population on the basis of BMI-value. Only those with a BMI < 25 kg/m² (n=385) or a BMI ≥ 30 kg/m² (n=159) were included in Study III. In the examination group for Study III, smoking habits, exercise habits, blood pressure (systolic and diastolic pressure), total cholesterol, and blood glucose, were analysed. For smoking behaviour, classification was made for smokers and non-smokers, and exercise habits were dichotomised into those who exercised at most 1-2 times per week and those who exercised 3-4 times per week or more.

Study IV included questions about personal experience of illness and family history of CVD. Illness experience was based on questions of whether the individuals had diabetes, were being treated for hypertension, angina pectoris or were receiving hospital treatment for cardiac infarction or stroke. Questions concerning family history stated whether their parents had been ill or died with CVD before the age of 55. The risk behaviours analysed in Study IV were smoking habits, exercise habits, and BMI and the risk behaviour was dichotomised into smoker/non-smoker, exercise seldom or never/exercise at least 1-2 times/week and BMI ≥ 30kg/m²/ BMI < 30kg/m².

Questionnaire

The questionnaire included in Studies I, II and III was based on a previously used questionnaire from the Danish RISIKALK-project in Vejle, Denmark (167). It contains background data questions about gender, employment, and education, as well as a number of knowledge questions about risk factors for CVD (See Appendix). In Study I, knowledge questions were divided into three main groups:

- behaviour questions (e.g. smoking, exercise, diet, alcohol, stress, obesity), asking how important these types of behaviour are in avoiding the risk for CVD. The questions had four response alternatives: very important, important, insignificant, don’t know.
- factors (27 items) and measures (18 items) that increase or decrease the risk for developing CVD. There were three response alternatives: yes, no, don’t know.
- questions to assess whether the participants’ understanding of knowledge about causes of CVD was adequate (with three response alternatives) and a rank-ordering of the five most significant factors regarding the risk of developing CVD.
In Study II, 18 items were included that relate to knowledge about risk factors. Of the original 27 item list of factors that increase or decrease the risk, 8 items were excluded because they were considered to overlap some of the remaining items. In addition, questions were included regarding how important it is to change behaviour to reduce the risk for CVD (smoking, exercise, diet, alcohol, stress, overweight, working environment) with the response alternatives: very important, important, insignificant, don’t know. The rest of the questions in the questionnaire were excluded. The Swedish questionnaire was translated to Polish with the help of people whose native language was Polish. After that, the questionnaire was proofread by district nurses in Wroclaw, Poland who were involved in the screening program. Education level, in Study II, consisted of two categories: low educated (primary school and secondary school) and high educated (college or university education).

Study III included the background variables gender and education. Education was categorised in a similar way as in Study II (low and high educated). Knowledge questions were the same as in Study II, namely 18 items about factors that increase respectively decrease the risk for CVD.

Statistical analyses

All the calculations were performed with the Statistical Package for Social Science 12.0 (SPSS) except one analysis in study II where STATXACT (version 4.01) was used. A p-value of < 0.05 was considered as significant, except for interaction analyses where the significance level was set to p < 0.10.

Study I

In study I chi-square test was used for comparison of non-parametric data between groups with different educational level and socio-economic status. The Spearman statistic for ordinal data was used to study the correlation on the ranking of risk factors. The unpaired t-test (two-tailed) was used to assess the ranking of CVD-associated risk factors. A factorial analysis was used to aggregate factors and interventions, which either increased or decreased the risk of acquiring CVD. Four different dimensions were established in the following way:

- the dimension "diet and blood pressure" including the following factors which increase or decrease the risk for CVD: saturated fat in food, unsaturated fat in food, sugary food, small amount sugary food, a lot of cholesterol in food, small amount cholesterol in food, a lot of cholesterol in blood, small amount of cholesterol in blood, hypertension and low blood pressure.
the dimension "exercise" including the following interventions that increase or decrease the risk for CVD: do more, or do less, exercise.

- the dimensions "diet" including the following interventions that increase or decrease the risk for CVD: restrict cholesterol diet, restrict eating of eggs and restrict salt in diet.

- the dimension "coffee" including the following interventions that increase or decrease the risk for CVD: high coffee intake and low coffee intake.

For each dimension the count of correct answered items were summarized, and the mean value for each participant was calculated.

Multivariate analysis (multiple linear- and logistic regression) was used to assess the adjusted relation of the independent variables (gender, SES, and level of education) to the dependent variables “diet and blood pressure” and “self-perceived need of knowledge”.

Study II

In study II, multiple logistic regression was used for comparisons of dichotomy responses between groups from different countries (Poland = 1, Sweden = 0), gender (men = 1, woman = 0), level of education (low education = 1, high education = 0). Ordinal logistic regression was used for analyses of ordinal responses (smoking: 0 = never smoked, 1 = ex-smokers; exercise: 0 = daily, 1 = 3-4 times/week, 2 = 1-2 times/week, 3 = 1-2 times/month, 4 = never). In figure 4, smoking habits and exercise habits in relation to country are presented as proportion.

Study III

In study III, the chi-square test was used to test the relationship between gender, level of education, and body weight. The dimension of the variables concerning knowledge about risk factors was reduced by a factor analysis. Differences in the profiles of these dimensions for high and low educated, with respect to BMI categories (< 25 kg/m², ≥ 30 kg/m²), were tested by a non parametric test for interactions based on aligned ranks (168). The scores that are produced have a mean of 0 and standard deviations equal to the squared multiple correlation between the estimated factor scores and the true factor values. In case of similar profiles in both categories, a further comparison using the stratified Wilcoxon rank sum test, as adopted by STATXACT (version 4.01) was run. If the null hypothesis was rejected, a Wilcoxon (Mann-Whitney) rank sum test was run within each education level and BMI category separately. Multiple logistic regression was used for comparisons of dichotomy responses (smoking and exercise) between groups with different BMI and level of education, and to assess possible interactions between these factors.
Study IV

In study IV the experience of illness and family history of CVD in relation to country, gender, and level of education were presented as proportions. Multiple logistic regression was used to study the relationship between dichotomous responses and following factors: smoking habits (non smokers = 1; current smokers = 0), exercise habits (exercise regularly = 1, exercise seldom/never = 0) and actual BMI-level (BMI < 30 kg/m² = 1, BMI ≥ 30 kg/m² = 0). The analyses were adjusted for country, gender and level of education if applicable (p < 0.05). First order interactions terms were also tested for possible inclusion (p < 0.10).

Ethics

The Swedish part of the studies was approved by the regional human ethics committee (Uppsala University, Sweden). The head of the health authorities in the City of Wroclaw conducted the Polish part of study II and IV.
Results

Study I

Women, to a greater extent than men, considered it very important to change living habits to avoid becoming ill with CVD. There was a significant difference between women and men concerning the significance of changing diet habits (61 % versus 47 % p < 0.05). Likewise, women, to a higher degree than men, considered it important to try to change the work environment to reduce the risk for CVD (36 % versus 27 %, p < 0.05). More women than men reported that it was very important to avoid high alcohol intake in order to avoid CVD (47 % versus 28 %, p < 0.05). See Figure 1.

![Figure 1](image)

**Figure 1.** The importance of changing habits that could potentially reduce the risk of CVD; differences between men and women.

People with high SES, to a greater extent than those with a low SES, considered it very important to change exercise habits to reduce the risk of CVD (SES I 63 % versus SES III 51 %, p < 0.05).
In analysis of the factors that increase/decrease the risk for CVD, significant differences between men and women emerged. Regarding factor analysis, the dimension, “diet and blood pressure”, showed that more women than men considered factors that were included in this dimension to increase/decrease the risk for CVD. The dimension, “diet and blood pressure”, includes the factors: saturated fat in food, sugary food, high cholesterol levels in food, high cholesterol levels in blood and hypertension. A comparison of groups with different SES levels showed that people with high SES had a better knowledge of the factors concerning "diet and blood pressure". For this same dimension, it was shown that the high educated had a significantly better knowledge than the low educated.

Significant results between the high and the low educated emerged when participants stated which measures reduce the risk for CVD. The high educated, to a greater extent, referred to measures that relate to the "diet" dimension. Factors included in the “diet” dimension were: restrict cholesterol diet, restrict eating of eggs, and restrict salt in diet. Moreover, women with high education and high SES had significantly better knowledge about the risk factors related to CVD in comparison to women with low education and low SES (p < 0.05). Similar results emerged for men with respect to education level and SES (p < 0.05).

The continuous dependent variable “diet and blood pressure” was tested with multiple linear regression. The analysis showed significant relation for each independent variable (gender, SES), controlled for the effects of the other (p < 0.05).

When participants ranked risk factors, smoking was viewed as the most important risk factor regarding an increased risk in the development of CVD for both men and women. Other factors showing significant differences were blood pressure (more important for women) and exercise (more important for men). A very high correlation was found between those with different SES and level of education (high SES versus low SES r_s = 0.96; high educated versus low educated r_s = 0.99) on the ranking of risk factors for CVD.

Study II
Study II, where a Swedish population was compared to a Polish population, showed that more Swedes considered it very important to change dietary habits to reduce the risk for CVD (Sweden 54 % versus Poland 23 %; OR = 0.25; 95 % CI = 0.2-0.3; p < 0.001). On the other hand, Poles, to a higher degree than Swedes, considered it important to influence stress in order to reduce the risk for CVD (Sweden 60 % versus Poland 72 %; OR 1.7, CI 1.4-2.1; p < 0.001). In the Swedish population the work environment was also emphasised as an important factor to reduce the risk of developing CVD (Sweden 32 % versus Poland 27 %; OR 0.8; 95 % CI = 0.6-1.0; p = 0.033).
These differences between Sweden and Poland also remained when the data was adjusted for gender and education level. See Figure 2.

![Figure 2](image_url)

**Figure 2.** The importance of changing habits that could potentially reduce the risk of CVD; differences between Sweden and Poland.

With adjustments made for nation and education level, the men regarded diet habits, stress factors, alcohol habits, and working environment to be less important factors than the women did. When adjusted for nation and gender, the high educated, to a greater degree than the low educated, considered it important to change diet habits, while the low educated considered it more important to change alcohol habits.

The Polish participants (adjusted for gender and level of education) stressed significantly (p < 0.05) more often than the Swedish participants that smoking, a stressful life, high blood pressure, high levels of cholesterol in food, high blood cholesterol, high alcohol intake, saturated fat in food, old age, diabetes, sugary food, and unemployment were factors which increased the risk of developing CVD. On the other hand, the Swedish participants reported, to a significantly greater extent, that heredity increased the risk and that plenty of fibre in food reduced the risk (p < 0.05).

When comparing the Swedish and Polish study populations, altered smoking behaviour was more common among Swedes than among Poles. Thirty-nine percent of Swedes were ex-smokers compared to 23% of the Poles (OR = 0.4; 95% CI = 0.3-0.5; p < 0.001). In the examination group,
more Poles were smokers than Swedes (33 % versus 25 %; OR = 1.7; 95 % CI = 1.25-2; p < 0.001). These differences were also significant after adjusting for gender and education level. As Figure 4 shows, Swedes exercised more regularly than Poles, even when the data was adjusted for gender and education level (OR = 0.2; 95 % CI = 0.04-0.35). See Figure 3.

Figure 3 Distribution of smoking and exercise habits among Polish and Swedish participants.

Study III

Regarding comparisons of education level and BMI, a significantly higher proportion of the low educated were obese compared to the high educated (33 % versus 18 %, p < 0.002).

In line with the results in Study III, there was no difference between obese people and those with a normal weight regarding knowledge about the risk factors for CVD. With reference to analysis of the interaction effect between education level and BMI, education level was the strongest factor when knowledge of the risk factors was tested. Within the group of normal weighted people, the high educated showed a significantly better knowledge than the low educated about the fact that “the risk is increased by saturated fat in food, high blood cholesterol, and cholesterol-rich food”. Both obese and normal weight people who were high educated had greater knowledge than the low educated about how risk factors such as diabetes, hypertension, diet, family history, and alcohol habits, relate to CVD (Table 2).

A significant interaction existed between education level and BMI for systolic and diastolic blood pressure, as well as for total blood cholesterol. Low educated people with obesity had significantly higher systolic blood
pressure (140 mmHg versus 125 mmHg; \( p < 0.001 \)), diastolic blood pressure (90 mmHg versus 80 mmHg; \( p < 0.001 \)) and total blood cholesterol (5.8 mmol/L versus 5.5 mmol/L; \( p = 0.004 \)) than low educated people with a normal weight (Table 3).

People with normal weight exercised with more regularity than those who were obese (49 % versus 36 %; \( p = 0.002 \)) and the high educated, irrespective of BMI level, tended to exercise more often than the low educated (50 % versus 44 %; \( p = 0.082 \)). Smoking was more common among normal weighted participants than among obese participants (28 % versus 19 %; \( p = 0.03 \)). See Table 3.
Table 2. Knowledge about CVD risk factors in relation to educational level and body weight expressed as median of dimension scores (Q1, Q3).

<table>
<thead>
<tr>
<th>Dimension (factor-loading within brackets)</th>
<th>BMI&lt;25 kg/m²</th>
<th>BMI≥30 kg/m²</th>
<th>BMI&lt;25 kg/m²</th>
<th>BMI≥30 kg/m²</th>
<th>Interaction p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-educated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimension 1</td>
<td>0.20 (-0.01, 0.47)</td>
<td>-0.002 (-0.32, 0.50)</td>
<td>0.21 (-0.08, 0.50)</td>
<td>0.21 (-0.03, 0.54)</td>
<td>0.46 0.21 (-0.08, 0.50)</td>
</tr>
<tr>
<td>Obesity (0.709)</td>
<td>-0.002 (-0.32, 0.50)</td>
<td>0.46</td>
<td>-0.002 (-0.32, 0.50)</td>
<td>0.46</td>
<td>0.48</td>
</tr>
<tr>
<td>Fatty food (0.696)</td>
<td>-0.002 (-0.32, 0.50)</td>
<td></td>
<td>-0.002 (-0.32, 0.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking (0.693)</td>
<td>-0.002 (-0.32, 0.50)</td>
<td></td>
<td>-0.002 (-0.32, 0.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stressful life (0.630)</td>
<td>-0.002 (-0.32, 0.50)</td>
<td></td>
<td>-0.002 (-0.32, 0.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Low-educated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimension 2</td>
<td>0.55 (-0.13, 0.64)</td>
<td>0.55 (-0.43, 0.71)</td>
<td>0.37 (-0.36, 0.64)</td>
<td>0.44 (-0.24, 0.68)</td>
<td>0.90 0.37 (-0.36, 0.64)</td>
</tr>
<tr>
<td>Saturated fat in food (0.587)</td>
<td>-0.13 (-0.43, 0.71)</td>
<td>0.55</td>
<td>-0.13 (-0.43, 0.71)</td>
<td>0.55</td>
<td>0.90</td>
</tr>
<tr>
<td>High blood cholesterol level (0.722)</td>
<td>-0.13 (-0.43, 0.71)</td>
<td>0.55</td>
<td>-0.13 (-0.43, 0.71)</td>
<td>0.55</td>
<td>0.90</td>
</tr>
<tr>
<td>Cholesterol rich food (0.816)</td>
<td>-0.13 (-0.43, 0.71)</td>
<td>0.55</td>
<td>-0.13 (-0.43, 0.71)</td>
<td>0.55</td>
<td>0.90</td>
</tr>
<tr>
<td>Diabetes (0.647)</td>
<td>0.30 (-0.33, 1.03)</td>
<td>0.06 (-0.39, 0.49)</td>
<td>-0.03 (-0.91, 0.90)</td>
<td>-0.10 (-0.81, 0.62)</td>
<td>0.21 -0.03 (-0.91, 0.90)</td>
</tr>
<tr>
<td>Sugary food (0.476)</td>
<td>-0.33 (-1.03, 1.03)</td>
<td>0.06</td>
<td>-0.33 (-1.03, 1.03)</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td>Hypertension (0.489)</td>
<td>-0.39 (-0.49, 0.49)</td>
<td>0.06</td>
<td>-0.39 (-0.49, 0.49)</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td>Heredity (0.418)</td>
<td>-0.91 (-1.03, 0.90)</td>
<td>0.06</td>
<td>-0.91 (-1.03, 0.90)</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td>High alcohol intake (0.547)</td>
<td>-0.81 (-0.81, 0.62)</td>
<td>0.06</td>
<td>-0.81 (-0.81, 0.62)</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td><strong>High-educated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimension 3</td>
<td>0.62 (-0.42, 0.89)</td>
<td>0.75 (-0.53, 0.91)</td>
<td>0.03 (-0.69, 0.82)</td>
<td>0.26 (-0.74, 0.76)</td>
<td>0.21 0.03 (-0.69, 0.82)</td>
</tr>
<tr>
<td>Physical inactivity (0.779)</td>
<td>-0.42 (-0.89, 0.89)</td>
<td>0.75</td>
<td>-0.42 (-0.89, 0.89)</td>
<td>0.75</td>
<td>0.21</td>
</tr>
<tr>
<td>Small amount fibre in food (0.684)</td>
<td>-0.53 (-0.91, 0.91)</td>
<td>0.75</td>
<td>-0.53 (-0.91, 0.91)</td>
<td>0.75</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>High-educated</td>
<td>Low-educated</td>
<td>Interaction p-value</td>
<td></td>
<td></td>
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<tr>
<td>----------------------</td>
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<td>---------------------</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>BMI&lt;25 kg/m²</td>
<td>BMI≥30 kg/m²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=102</td>
<td>n=23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMI&lt;25 kg/m²</td>
<td>BMI≥30 kg/m²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=283</td>
<td>n=136</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smoking habits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current smoker (%)</td>
<td>23</td>
<td>13</td>
<td>0.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>20</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exercise habits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise least 3-4 times/week (%)</td>
<td>50</td>
<td>52</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>33</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Blood pressure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic pressure mmHg</td>
<td>120 (111, 135)</td>
<td>130 (120, 142)</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>125 (115, 140)</td>
<td>140 (130, 150)</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic pressure mmHg</td>
<td>80 (70, 85)</td>
<td>85 (80, 90)</td>
<td>0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>80 (75, 85)</td>
<td>90 (85, 98.7)</td>
<td>0.001</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total blood cholesterol</strong> mmol/L</td>
<td>5.65 (5.0, 6.3)</td>
<td>5.3 (4.9, 6.1)</td>
<td>0.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.5 (4.9, 6.3)</td>
<td>5.8 (5.3, 6.5)</td>
<td>0.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fasting blood glucose</strong> mmol/L</td>
<td>5.3 (4.9, 5.8)</td>
<td>5.2 (4.7, 5.8)</td>
<td>0.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.2 (4.8, 5.7)</td>
<td>5.4 (4.9, 6.0)</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.16</td>
<td></td>
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</table>
Study IV

Of the total number in the study group, 19 % (n = 388) had personal illness experience and 21 % (n = 424) had a family history of CVD. Considerably more Poles than Swedes had personal experience of illness (Poland 27 % versus Sweden 10 %) and a family history of CVD (Poland 27 % versus Sweden 14 %). Among both Poles and Swedes, those with a low education had a greater extent of illness experience than those who were high educated (Poland low educated 29 % versus high educated 23 %; Sweden low educated 12 % versus high educated 5 %).

There was a significant association between family history and personal experience of illness (x² = 15.481, p < 0.001).

The results showed that those who had personal experience of illness more often were non-smokers than those who did not have experience of illness; adjusted for family history, gender, level of education, and nationality (OR = 1.48; 95 % CI = 1.14-1.93) (Table 4). Family history of CVD, adjusted for illness experience, gender, level of education and country, did not lead to more positive smoking behaviour (OR = 0.84; 95% CI = 0.66-1.07). These results indicated that experience of illness influences smoking behaviour to a higher degree than family history.

Family history and personal illness experience of CVD were not predictive of more physical exercise compared to participants with no illness experience or no family history of CVD. Swedes had increased odds (OR = 2.82; 95 % CI = 2.22-3.59) for exercising regularly compared to Poles; adjusted for illness experience, family history, gender, and level of education (Table 4). The results also showed an interaction effect for illness experience and nationality. Poles with experience of illness exercised more rarely than Swedes with experience of illness.

Furthermore, the results showed that those who had illness experience and a family history of CVD were more often obese than those with no illness experience and no family history of CVD; adjusted for gender, nationality, and level of education. Poles had increased odds for obesity compared to Swedes, and more men than women were extremely overweight. The interaction between family history and nationality showed that there were increased odds that Poles with a family history of CVD were obese. In addition, for participants with family history the odds for being obese were greater among men than women. See table 4.
Table 4. The influence of adjusted experience of illness (reference = no experience of illness) and family history (reference = no family history) of CVD on smoking (event = non-smoker), exercise habits (event = exercise regularly) and obesity (event = non-obese) including first order interactions.

<table>
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<tr>
<th></th>
<th>P-value</th>
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<th>95% CI Lower</th>
<th>95% CI Upper</th>
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<td><strong>Smoking habits</strong></td>
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* reference category
Discussion

The primary aim of this thesis was to study factors that influence health-related behaviour.

The results showed that knowledge varies with education, gender and, to a certain degree, nationality. Moreover, knowledge was influenced by behaviour related medical conditions such as obesity. However, knowledge is not the only condition for behaviour change. The results of the present thesis support earlier theories that describe risk behaviour change as a process. This process with reference to behaviour change is thought to be facilitated, to a certain degree, by personal experience of illness, at least in the inclination of stopping smoking. Processes of change can also be discerned on a national level since Poles, despite having good knowledge about risk factors, changed their behaviour to a lesser extent than Swedes. One way of explaining this can be that public health work focused on the prevention of CVD has had a shorter history in Poland.

A starting point has been the idea that public health work could be more effective if more consideration was given to people’s different abilities to take on board primary preventive interventions. Prevention in the area of CVD has been described as a scientific dilemma (83). The dilemma in population-focused strategies is that high risk and low risk individuals are treated in a similar way and that a large proportion of the individuals are unnecessarily subjected to preventive measures (83, 169). This thesis indicates that “unnecessary” preventive work could be avoided if a greater degree of consideration was given to individual conditions such as level of knowledge and perceived threat of illness. This strategy with a focus on cognitive aspects should make a more effective preventive health project and, at the same time, fulfil internationally recommended guidelines for the prevention of CVD (54). These guidelines stress that individuals should understand the connection between behaviour, health, and illness, and also that personnel must help individuals to become more aware of the barriers that can complicate behaviour change.

One result that emerged in the present thesis was that those with a low education had insufficient knowledge about the significance of risk factors for developing CVD. This result is consistent with several findings from studies with other designs (111, 120, 125, 170-172).
One explanation for these findings may be that health information in the media and through campaigns may sometimes not reach the low educated. Another explanation can be that the information is designed in a way that the low educated can not make use of. General knowledge about the facts that increase the risk for CVD is relatively good. However, specific knowledge is more inadequate (173-175). Knowledge among the low educated, above all, was insufficient concerning diet and eating habits. Other studies have also shown that people have insufficient knowledge about the content of food products and the risk of developing illness (176, 177). Insufficient knowledge among the low educated has consequences for behaviour (178). Studies indicate that the low educated eat more fatty food and less fruit and vegetables compared to the high educated (179). Insufficient time for cooking and the high cost of food were mentioned by low educated women as reasons for bad eating habits (179).

Gender was an additional factor that had a correlation to knowledge about risk factors for CVD, where women had better knowledge than men. This confirms previous research (180, 181). In a study consisting only of men, this lack of knowledge was corroborated and primarily related to knowledge about diet (182). A traditional gender perspective states that women take greater responsibility for health and factors relating to health within families (183, 184). Despite the fact that women and men spend a similar amount of time at work, women are more often responsible for food and eating habits at home (179, 185).

One explanation for the findings may be that women’s responsibility for cooking and eating habits result in an increased involvement and interest in questions concerning diet and health. In general, women indicate that things such as the change of eating habits come about from dietary advice and recommendations. Women willingly choose to read magazines where health related issues are central themes. Gender differences in knowledge about diet also varies with level of education and socioeconomic status, where differences are more pronounced between, rather than within, socioeconomic groups (48, 186, 187).

The results in Study II showed that Poles had good knowledge about the risk factors for CVD. However, Swedes had less risk behaviour. One example of this was that more Swedes than Poles had stopped smoking. The fact that the discrepancy between knowledge and behaviour was greater in Poland than in Sweden suggests that behavioural change is a gradual process. Sweden may have come further in this process of change because preventive health projects have been going on for a long time. The first preventive health projects in Poland were started 20 years after such projects started in Sweden (76, 156).

Swedes indicated that it is very important to change eating habits to avoid CVD, while Poles rated stress factors as more significant. Economic
difficulties, which characterised Poland during the last decade, may naturally have contributed to a lower priority being given to good eating habits in everyday life. People in different social groups are exposed to social and economic circumstances to different extents, a fact that contributes to differences in risk behaviour and health (188, 189).

According to the results in Study III, insufficient knowledge was not the primary reason for obesity. Difference in knowledge about risk factors appeared to be more pronounced among low and high educated individuals than when normal weight and obese people were compared. The results in Study III indicated that obese individuals were, to a great extent, low educated. Preventive primary work with obesity is complicated because the reasons behind obesity are both genetic and dependent on behaviour and, in addition, there are a number of other known risk factors for CVD.

Current studies show that health information and counselling of individuals has decreased and this has primarily affected the low educated (190). Preventive work with those who are obese requires new strategies, whereby a multiplicity of different factors needs to be taken into account (48). Surveying both level of knowledge and self-efficacy ought to be starting points to make these strategies successful (191-194).

It seems to be a reasonable assumption that perceived threat of illness will predict increased health behaviour. However, contrary to this logic, Study IV suggested that personal experience of illness and a family history of CVD did not influence health behaviour to any great extent. The only exception was that personal experience of illness was associated to more healthy smoking behaviour, evidence that information about the dangers of smoking have been successful (195). One reason that threat of illness did not affect other risk behaviour may be that information did not reach out to or was badly adapted for the individual. The same condition showed in relation to family history as a risk factor, where a number of studies have indicated insufficient knowledge about family history as the reason (137-139). The utilisation of personal illness experience and family history to motivate behaviour change is a strategy that ought to be used to a greater extent in preventive work (135, 196-198).

Knowledge about risk factors and the threat of illness have been central concepts in this thesis. From a cognitive theoretical perspective, knowledge of illness and perception of the threat of illness constitute predicting factors for behaviour (87, 199). According to the HBM (Health Belief Model) the information that individuals receive from mass media and health campaigns consists of “signals” to start behaviour change, but if this information is not adapted to the individual it may not achieve its goal. Personal experience of illness and family history, according to the HBM, also constitute the factors that, theoretically, will lead to changed behaviour. From the results of Study
IV, only smoking behaviour tended to be affected by personal experience of illness. The HBM, to a certain degree, can describe what predicts behaviour but have difficulties in describing what factors bring about behaviour change. This is a limitation in the model which emerged when the HBM was tested (92, 200, 201). In order to increase the practical benefits of the HBM, preventive work must pay more thorough attention to the cognitive factors of HBM. One example regarding individual health counselling can be to have more detailed discussions of perceptions of the threat of illness, and the possibilities and hindrances for behaviour change.

The SOC model has been used previously on individual and group levels (100, 101, 103-105, 202) but the results of Study II indicates that SOC also is applicable to the national level. The finding that more Poles than Swedes were smokers and that a greater proportion of the Swedish population had stopped smoking may indicate that many Poles were in a phase of “precontemplation”. That is, even though they may be aware of the dangers of smoking they may not relate this to their own behaviour. Other possible phases are contemplation (contemplating risk behaviour) and preparation (preparing for behaviour change). The SOC model may thus be a helpful framework for explaining lags in behaviour change between Eastern and Western European countries.

Methodological considerations

In the screening programs that provided data to the present thesis some 60 % of the entire target group in Sweden participated in the screening. In Poland the corresponding figure was about 50 %. The fact that a great proportion of the target group did not participate poses a risk for systematic bias. Non-participants were studied in the County Council of Västmanland’s cardiovascular programme a few years before the actual gathering of data. A non-participants analysis was done on a randomised selection of 112 people at 8 health centres. The result showed that low educated people, men, and smokers were over represented among those who did not participate in health examinations (164). No systematic differences between participants and non-participants emerged for other variables. The demographic differences between participants and non-participants that emerged with the non-response analysis fits very well with the results of other studies and the bias effects there were also considered marginal (203-208).

In the World Health Organisation’s MONICA Project, concerns were expressed over respondents’ rates in community based surveys of cardiovascular risk factors. Declining respondents’ rates pose a threat to the accuracy of estimates of risk factor trends in many countries. These trends seem to follow the same pattern among populations that differ geographically and
politically. Individuals who do not take part in health examinations are generally young, unmarried, low educated men with an unhealthy lifestyle (205, 209). Because Poland is one of the countries included in the MONICA Project, support is given to the assumption that the Polish population follows the same pattern when it comes to non-response. In the Polish population, a comparatively high number of the participants were high educated which can be explained by the fact that Wroclaw is a university town. The distribution of participants according to education levels would probably have been different if the population had been more of a mixture of town and rural populations. Earlier studies in Poland show that populations in smaller towns and in the countryside have insufficient knowledge about risk factors for CVD as well as greater risk behaviour (210, 211).

Another possible bias effect could be that the gathering of information in Poland was done three years after the Swedish data collection. However, this effect would be likely to bias results against the lag in behavioural change noted among poles as compared to Swedes, rather than for it.

Self-reported smoking and exercise habits were included in the screening of risk factors. The gathering of information with an instrument that involves self-reporting carries the risk of bias effects through the study participants’ tendency to underestimate smoking habits (212) and overestimate exercise habits. The element in the thesis that counteracts this bias effect is having a clear definition of what is meant by physical activity (213, 214). In order to strengthen the validity of self-reporting, combinations of measurement instruments are recommended. Self-reports of smoking habits, obesity, and diabetes has relatively good reliability, but physiological tests are recommended as complements to self-reports (215). In order to increase the reliability further for measuring smoking habits, proxy reporting is a method that complements self-reporting (216). Individual awareness about the presence of risk factors needs to improve before self-reporting can be used as a reliable instrument in risk factor screening (217).

In this thesis a cross-section design was applied. This means that conclusions regarding the directions of cause-effect relationships must be drawn with caution. So for instance the finding of a relation between obesity and a tendency not to exercise may be caused by an influence of obesity on exercise (it may be harder to exercise when you’re fat) but it may also be caused by an influence of exercise on obesity (if you don’t exercise you may become fat). In cross sectional studies where all variables are measured at the same time and no variable is experimentally manipulated, definite conclusions regarding these kinds of directions cannot be drawn.

The questionnaire from which data was derived was a revised version of a questionnaire that had previously been used in a cardiovascular project (Risikalk-projektet) in Vejle, Denmark (167). The knowledge-related questions were designed to be comprehensible to a lay audience (218). Questions regarding CVD knowledge were of a general character and were assessed as
being relevant for the risk of developing CVD. One reason for the choice of questions was that the questions should focus on lay knowledge, as well as starting from a logical and rational basis (218). Having this starting point and clarifying the relation between lay and expert knowledge has been put forward as an essential aspect in giving advice and information within public health work (219).

One of the strengths of this thesis is that the results were population-based which makes it possible to generalise to a greater extent than is the case with random samples. The Swedish study population, with a mixture of people from the town and countryside, can probably be considered representative of the Swedish general population. The Polish material differed from the Swedish mainly in that the town of the study has one of the largest universities in Poland. One factor probably influencing the results in Study II could be a difference in attitude between residents in post-Communist countries in Central Europe and residents in Western European countries. In general it is considered that post-communists has a more explicitly sceptical attitude to authorities where one easily adopts a "wait and see" attitude (220), which can influence the effects of health campaigns organised by society.

In study I educational level and socioeconomic status were divided into three groups, and in study II, III and IV educational level was divided into two groups. In Sweden, 12 years of education comprises nine years of compulsory primary schooling and three years of secondary schooling. Thereafter the next level of schooling is university studies. Twelve years is thus a natural cut-off point when the Swedish educational system is considered.

The study group in this thesis comprised of a single age group, which is a limitation. Nonetheless, such selection may be beneficial in some instances. For example, because of the standardization of age, it was easier to make comparisons between other important background factors.
Conclusions

- Men with low educational level and low socio-economic status had deficient knowledge about risk factors related to CVD.

- Processes of behaviour change can also be discerned on a national level since Poles, despite having good CVD knowledge about risk factors, changed their behaviour to a lesser extent than Swedes.

- Obese individuals are at an increased risk of developing other risk factors for CVD, but are just as knowledgeable about risk factors for CVD as normal weighted individuals.

- Individuals with a personal experience of illness may be more inclined to change smoking behaviour than the average person.
He lives a dangerous life, is 48 years old, overweight, stressed and untrained. The fact that he is on medication for high blood pressure and feels a pressure over his chest when he goes up and down the stairs does not make the situation better. There are obvious signs that something is wrong and that he should see a doctor.

What should the health professional do to make him understand how serious his situation is?

A basic condition for behaviour change is knowledge about risk factors. The results show that knowledge varies with education, gender and, to a certain degree, nationality. Moreover, knowledge is influenced by behaviour related medical conditions such as obesity. However, knowledge does not only consist of the conditions for behaviour change. The results in the present thesis substantiate earlier theories about risk behaviour change as being a process. This process may to a certain degree be facilitated by personal experience of illness, at least when it comes to the inclination of stopping smoking.

In summary, the implications of these results in the meeting with the individual patient are that it can be important to take a series of factors into consideration. These factors steer the patient’s ability to understand and to consider the consequences from the information given to her/him by the clinician. One dilemma within primary preventive work is that similar interventions often have different effects on different individuals and the ability of individuals to take information on board can vary. Predictors of risk behaviour on the individual level as well as national level may be important for health care professionals to understand and take into consideration in their everyday practise.
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Det övergripande syftet med denna avhandling var att i en population av 50-åriga män och kvinnor studera faktorer som påverkar beteende vid risk för hjärt-kärlsjukdom. I studie I testades eventuellt samband mellan kunskap om riskfaktorer och kön, utbildning och socioekonomiskt status, och i studie II studerades kunskap och riskbeteende i ett nationellt perspektiv (Sverige vs Polen). Vidare undersöktes i studie III om obesa individer (BMI $\geq$ 30 kg/m$^2$) skiljde sig från normalviktiga (BMI < 25 kg/m$^2$) med avseende på kunskap om riskfaktorer och i studie IV undersöktes om riskbeteende påverkades av egen sjukdomserfarenhet och hereditet för hjärt-kärlsjukdom.

Studierna är populationsbaserade med tvärsnittsdesign och resultaten baseras på individens kunskap om riskfaktorer vid hjärt-kärlsjukdom. I datain- samlingen ingår även testresultat från screening, där syftet var att identifiera riskfaktorer. Studierna genomfördes i samband med hälsoundersökning av 50-åriga män och kvinnor i Västmanland, Sverige (n = 1011) och i Wrocław, Polen (n = 1043). Den svenska populationens kunskap om riskfaktorer studerades i relation till kön, utbildning och socioekonomisk status (studie I). Wrocław i Polen har tillsammans med Landstinget Västmanland utarbetat en gemensam modell för screening av riskfaktorer och det möjliggjorde en jämförande studie mellan en svensk och en polsk population (studie II). I denna jämförelse ingick formuläret med kunskapsfrågor tillsammans med resultat från hälsoundersökningen. Den svenska populationens BMI-värde var underlag för en jämförande studie (III) mellan normalviktiga personer (BMI < 25 kg/m$^2$) (n=385) och personer med obesitas (BMI $\geq$ 30 kg/m$^2$) (n = 159). Mätinstrument i studie III utgjordes av frågeformulär och resultat från hälsoundersökningen. I studie IV var undersökningsgruppen 2054 personer (Sverige n = 1011, Polen n = 1043) där samtliga genomgått hälsoundersökning.
Deltagarna i studie IV fick ange om de hade erfarenhet av hjärt-kärlsjukdom och/eller årfältighet inom familjen för hjärt-kärlsjukdom, dessutom ingick uppgifter om aktuell BMI-nivå och självrapporterade rök- och motionsvanor.

Resultaten från studie I visade att kvinnor hade bättre kunskap än män om riskfaktorer för hjärt-kärlsjukdom samt att låg utbildning och låg socioekonomisk status var associerade till bristfällig kunskap. Vid jämförelser som gjordes mellan män och kvinnor med olika socioekonomisk bakgrund och utbildningsnivå visades att kvinnor genomgående hade bättre kunskap om riskfaktorer relaterade till hjärt-kärlsjukdom oberoende av socioekonomisk bakgrund. De tydligaste skillnaderna i kunskap gällde faktorer som var relaterade till kostvanor.

Vidare framkom i studie II att polacker hade minst lika goda kunskaper som svenskar om riskfaktorer för hjärt-kärlsjukdom, men svenskar ansåg att det är viktigare att ändra kostvanor och påverka faktorer i arbetsmiljön för att undvika risken att utveckla hjärt-kärlsjukdom. Svenskar hade också ett mindre riskbeteende än polacker och fler svenskar än polacker hade lyckats med att sluta röka.

Resultaten från studie III visade att personer med obesitas skilde sig inte från normalviktiga när det gällde kunskap om riskfaktorer för hjärt-kärlsjukdom, ett resultat som gällde oberoende utbildningsnivå. Obesitas och låg utbildning hade däremot tydligt samband med andra riskfaktorer relaterade till hjärt-kärlsjukdom, som exempelvis högt blodtryck och högt serumkolesterol.

I studie IV visade resultaten att personlig erfarenhet av sjukdom påverkar rökbeteende i högre grad än vad årfältighet för hjärt-kärlsjukdom gjorde. Bland obesa individer däremot, tycktes inte erfarenhet av tidigare sjukdom vara ett hot som motiverar till normalisering av vikten. Årfältighet av hjärt-kärlsjukdom hade inte någon inverkan på rökvanor, motionsvanor eller förekomst av obesitas.

En grundförutsättning för en individs beteendeförändring är kunskap om riskfaktorer och där visade resultaten att kunskap varierar med utbildning, kön och i viss mån nationell tillhörighet. Dessutom påverkades individens kunskap av beteendelaterade medicinska tillstånd som obesitas. Kunskap utgjorde dock inte den enda förutsättningen för förändring av beteende. Resultaten i avhandlingen bekräftade tidigare teorier om att förändring av riskbeteende är en process. Denna process vid beteendeförändring kunde i viss mån underlättas av egen sjukdomserfarenhet, åtminstone benägenheten att sluta röka. Resultaten i denna avhandling antyder att förändringsprocesser kan studeras på nationell nivå eftersom polacker trots goda kunskaper om riskfaktorer i mindre utsträckning än svenskar förändrade sitt beteende. En förklaring till detta kan vara att folkhälsoarbetare i syfte att förebygga hjärt-kärlsjukdomar har en kortare historia i Polen.

Folkhälsoarbete måste i större utsträckning ta hänsyn till människors olika förutsättningar. När det gäller riskfaktorer för hjärt-kärlsjukdom visade...
resultaten i denna avhandling att ett flertal faktorer har betydelse för att förstå en risksituation. Ett första steg i preventivt arbete är att förvissa sig om vilken kunskap som finns om riskfaktorer och att denna kunskap kan variera med hänsyn till kön och utbildning. Diskrepanser mellan kunskap och beteende kan variera dels beroende på riskbeteende och dels vilken fas till eventuell beteendeförändring som individen befinner sig i. Om preventiva insatser skall lyckas krävs att man kan identifiera i vilken fas individen befinner sig och sedan anpassa åtgärder efter det. Att använda sjukdomshot som motiverande faktor vid prevention kan vara en åtgärd för att åstadkomma ett mer hälsosamt beteende.
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Appendix
Frågeformulär

Kunskap om riskfaktorer för hjärt- och kärlsjukdom

Bakgrundsväriabler

Datum:________

Födelsedatum (år, månad, dag):________

1. Kön

☐ man
☐ kvinna

2. Hur många personer finns i hushållet (inklusive dig själv)?

___________(skriv antal)

3. Yrke______________________________

4. Hur många år har Du gått i följande skolformer? (skriv antal år)

☐ Folkskola______ år
☐ Grundskola _____ år
☐ Gymnasium _____ år
☐ Komvux ________ år
☐ Universitet/högskola ______ år
☐ Annan utbildning! Vilken? _________________________ _____ år
5. Vad tror Du är viktigt att befolkningen ändrar på för att undgå hjärt- och kärlsjukdom? (Besvara samtliga alternativ!)

<table>
<thead>
<tr>
<th></th>
<th>Mycket viktigt</th>
<th>Viktigt</th>
<th>Utan betydelse</th>
<th>Vet ej</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Tobaksrökning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td>Motion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.</td>
<td>Kost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.</td>
<td>Alkohol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.</td>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.</td>
<td>Övervikt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G.</td>
<td>Arbetsmiljö</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Anser Du själv att Du vet tillräckligt om hjärt- och kärlsjukdomar?

- [ ] Ja
- [ ] Nej
- [ ] Vet ej

Var vänlig svara ”ja”, ”nej” eller ”vet ej” för samtliga alternativ.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Ja</th>
<th>Nej</th>
<th>Vet ej</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Mycket motion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td>Lite motion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.</td>
<td>Övervikt (fetma)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.</td>
<td>Att väga för lite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.</td>
<td>Fet mat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.</td>
<td>Mycket mättat fett i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G.</td>
<td>Mycket omättat fett i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H.</td>
<td>Diabetes (sockersjuka)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.</td>
<td>Tobaksrökning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J.</td>
<td>Hög blodtryck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K.</td>
<td>Lågt blodtryck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.</td>
<td>Mycket socker i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.</td>
<td>Lite socker i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N.</td>
<td>Mycket kolesterol i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O.</td>
<td>Lite kolesterol i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.</td>
<td>Mycket kolesterol i blodet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q.</td>
<td>Lite kolesterol i blodet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R.</td>
<td>Hög alkoholförbrukning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.</td>
<td>Hög kaffekonsumtion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.</td>
<td>Stressad tillvaro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.</td>
<td>Mycket fibrer i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.</td>
<td>Lite fibrer i maten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X.</td>
<td>Ärftlighet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.</td>
<td>Hög ålder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z.</td>
<td>Att vara man</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Å.</td>
<td>Att vara kvinna</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ä.</td>
<td>Arbetslöshet/sysslolöshet</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. Nämnn de 5 riskfaktorer som Du anser mest ökar risken för hjärt- och kärlsjukdom! Skriv riskfaktorer i följd med den viktigaste först som 1, den näst viktigaste som 2 osv.

1. 
2. 
3. 
4. 
5. 

9. Vilket/vilka av följande förslag anser Du minskar risken för hjärt- och kärlsjukdom, oavsett om du gör dessa saker själv eller ej!

Var vänlig svara "ja", "nej" eller "vet ej" för samtliga alternativ.

|   | Ta medicin | Motionera mera | Motionera mindre | Undvika övervikt | Undvika stress | Undvika tobaksrökning | Röka 10 cigaretter om dagen | Undvika hög alkoholförråd | Dricka mera kaffe | Dricka mindre kaffe | Undvika socker/sötsaker | Åta fettfattig kost | Begränsa kostens kolesterolinnehåll | Begränsa intaget av ägg | Begränsa intaget av salt | Undvika p-piller | Försöka att ha goda arbetsförhållanden | Gå på regelbunden blodtryckskontroll | Annat. | V.a.d. |
|---|------------|----------------|------------------|-------------------|----------------|-----------------------|-----------------------------|-----------------------------|-----------------|-----------------|-----------------------------|----------------|--------------------------------|-----------------|------------------|----------------|--------------------------------|----------------|--------|
|   | [ ]        | [ ]            | [ ]              | [ ]               | [ ]            | [ ]                   | [ ]                         | [ ]                         | [ ]             | [ ]             | [ ]                         | [ ]           | [ ]                            | [ ]             | [ ]              | [ ]             | [ ]                            | [ ]             | [ ]    |

Tack för Din medverkan!
**UNDERSÖKNINGSFORMULÄR**

Itylls före undersökningen

Hemadressens postnummer: ..................................................

- Man
- Kvinna

Personnummer: ..................................................

Antal personer i hushållet Du själv medräknar: ........................................

Yrke: ..................................................

Antal utbildningsår efter grund-/folkskolan: ..................................................

- JA
- NEJ

  - Har Du sockensjuka (diabetes)? ..................................................
  - Behandlas Du för högt blodtryck? ..................................................
  - Har Du värddata på sjukhus för hjärntentast? ..................................................
    Om ja, var: .................................................. vilket år: ..................................................
  - Har Du värddata på sjukhus för slagsamtal? (ex hjärnblödning) ..................................................
    Om ja, var: .................................................. vilket år: ..................................................
  - Behandlas Du för kärlkramp (läkare)? ..................................................
  - Har Din mor och/eller far avlidit före 55-års ålder? ..................................................
    Om ja, vilken var orsaken: ..................................................

- Har Din mor och/eller far insjuknat i hjärtinfarkt före 55-års ålder? ..................................................

  Rökvanor:

  - Aldrig rökt

  - Rökt men slutat år: .............. mån: .............. 1 cigarett=1 g

  - Röker 1-14 g/dag: .............. 1 cigarett=2 g

  - Röker 15-49 g/dag: .............. 1 cigarett=6 g

  - Röker mer än 50 g/dag: .............. 1 pkt tobak=60 g

  - Snuvar: .............. JA .............. NEJ

Utöver Du på fritiden någon form av fysiskt ansträngande aktivitet exempelvis promenader eller trädgårdssavarter som varar mer än 30 minuter?

- JA, varje dag
- JA, 3-4 gånger/vecka
- JA, 1-2 gånger/vecka

**Itylls av sjukskötterska**

- Mottagning: ..................................................

- Datusi för hälsokontrollen År: .............. Mån: .............. Dag: ..............

- Blodtryck: .............. cm Hjärtfrekvens: ..............

- Kolesterol: .............. Blodsocker: ..............

- Vikt: .............. kg Längd: .............. cm BMI: ..............

- Mått: .............. cm Sluss: .............. cm Kvot: ..............

**BEDÖMNING:**

- Grupp 1a
- Grupp 1b
- Grupp 2
- Grupp 3

Patienten godkänner att kopiera sänds till beh. läk

- JA
- NEJ

Beh. läk: ..................................................

---

**ANALYSAPPARAT:**

- Reflotron
- Accutrend GC
- Annan

**LIPIDSTATUS:**

- Erbjudet 19 ...... / ......

- Provtagning datum 19 ...... / ......

- Uteblivit från provtagning

Orsak: ..................................................

---

Sjuksköt. Sign.
Acta Universitatis Upsaliensis

Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Medicine 186

Editor: The Dean of the Faculty of Medicine

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