

# **The Role of Health and Health Promotion in Labour Force Participation**

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# **The Role of Health and Health Promotion in Labour Force Participation**

## **De rol van gezondheid en gezondheidsbevordering in arbeidsparticipatie**

Proefschrift

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# 1

**General introduction**





## 1.1 INEQUALITIES IN HEALTH

During the last century, the combined effects of improvements in living and working conditions and advances in medicine and health care have led to a consistently increasing life expectancy in the European Union.[1] In 2007 in the EU, the life expectancy of a newborn boy at birth was 76.1 years and of a newborn girl 82.2 years. Life expectancy is, however, not equally distributed in society. Persons with a lower level of education, a lower occupational class, or a lower level of income tend to die at younger age, and to have, within their shorter lives, a higher prevalence of all kinds of health problems. This leads to tremendous differences between socioeconomic groups in the number of years that persons can expect to live in good health. In Europe, differences in healthy life expectancy typically amount to 10 years or more, counted from birth [2] According to many, such differences in health are unacceptable, and represent one of Europe's greatest challenges for public health.

Unemployed persons are a specific socioeconomically disadvantaged group. The relationship between unemployment and poor health has been well established, as demonstrated by a higher prevalence of illness and disability [3-4] and a higher mortality among unemployed persons.[5-6] Selection and causation may contribute to these inequalities in health among employed and unemployed persons. Selection may act through two different pathways: workers with a poor health may be more likely to leave the labour force, and unemployed persons with a poor health may be less likely to enter the workforce. Causation may also act in two different ways. Leaving the workforce may have a negative influence on health of the ex-workers. The other way around, gaining paid employment may have a positive influence on health.

Paragraph 1.2 (Health and Work) gives an overview of the current state of knowledge concerning the influence of health on entering or leaving the workforce. Paragraph 1.3 (Work and Health) is focused on the effect of gaining paid employment on health. Paragraph 1.4 (Health promotion among the unemployed) describes the current evidence on the effectiveness of health promotion interventions among unemployed persons for re-employment.

## 1.2 HEALTH AND WORK

There is ample evidence for the selection hypothesis.[7-11] A community based survey in the United Kingdom found evidence for health related job loss, especially in relation to musculoskeletal disorders and mental illness.[8] In a British household panel survey healthier persons were more likely to gain employment than persons with minor psychiatric morbidity.[10]

In many industrialized countries the population is ageing, due to increasing life expectancy and falling birth rates.[12] A rather paradoxical development is that, despite increases in life expectancy, the average time persons spend in paid work has decreased or been stable in most European countries. This paradox is explained by prolonged education among younger cohorts, and -even a more important contributor- higher rates of exit from the labour market at older ages.[13] As a consequence, many countries are developing policies to encourage older workers to remain longer in the labour market and delay retirement.[14] In 2009, the Dutch government planned to increase the state retirement age from 65 to 67.

Consequences of ill health for the likelihood of becoming or staying unemployed may depend on social and labour market policies which vary across European countries. For example, striking differences in access to benefits, such as early retirement or disability pension, for disabled persons have been described within the European Union. In the Netherlands less than 10% of disabled persons have their main source of income through labour whereas in Sweden this proportion amounts to over 50%. [15] There are different pathways that may lead workers out of the workforce, such as disability pension, retirement, unemployment or becoming a homemaker. There may be differences between countries with respect to the pathway persons with health problems take out of the workforce. Health problems are surely a predictor for exit out of the labour force into disability pension. Evidence for the influence of health on exit out of the labour force into retirement, unemployment or taking care of the household is less clear.

There is little evidence about the time-dynamics of health related selection into or out of the labour force. It may take some time before health complaints may result in loss of paid employment. Similarly, improvements in the health status of unemployed persons may need some time to influence the likelihood of becoming re-employed.

The associations between health and employment may not be similar across all socio-economic groups. Personal characteristics, such as age, education, ethnic background and sex, and household characteristics, such as marital status or household income, will influence the social context of health and employment status and, thus, influence the associations between health and employment.[9]

### 1.3 WORK AND HEALTH

There is also evidence for the causation hypothesis. Job loss may lead to impaired role and emotional functioning, poor health, depression, and low self esteem. [16-17] In a recent study among British households with 11 year follow-up unemployment had a strong effect on the incidence of any limiting illness and re-employment was related

to recovery from these illnesses.[3] A review of 16 longitudinal studies concerning mental health effects of unemployment concluded that loss of employment affected mental health, but also that gaining employment improved mental health.[18] A British longitudinal study found that transitions from paid employment to various forms of non-employment (unemployment, long-term sick leave, maternity leave) had a negative impact on mental health. Transitions from non-employment to formal employment resulted in an improvement of mental health.[10] This was also found in a five-year follow up study among long-term unemployed Norwegians which reported recovery of mental health within six months after re-employment.[19]

In a review Waddel and Burton[20] concluded that re-employment leads to clear benefits in psychological health and some measures of well-being, although there is a dearth of information on physical health. A study on the psychological and physical well-being during unemployment also demonstrated that the bulk of research is focused on mental health outcomes, suggesting that other aspects of health need more attention.[21] Research is needed to investigate whether re-employment also has beneficial effects on physical health, and if this is true, whether re-employment has an immediate effect on physical health.

#### 1.4 HEALTH PROMOTION AMONG THE UNEMPLOYED

A poor health will act as a barrier to return to paid employment.[16-17, 22] In order to increase the possibilities for re-employment, improvements in health of unemployed persons may, therefore, be an important step.

Unemployed persons with chronic health complaints, such as musculoskeletal disorders, may become progressively less healthy, since fear of pain and reinjury may lead to reduced activities [23], resulting in a passive lifestyle with low levels of physical activity.[7, 24] Hence, exercises to improve physical activity may be beneficial, not only for those subjects with disorders of the locomotive system, but also for other chronic diseases as well, including heart and pulmonary diseases and depression.[25] In a review Pedersen and Saltin [25] concluded that exercise therapy has positive effects on general well-being, physical health and depressive symptoms of persons with chronic diseases.

Cognitive-behavioural therapy may be needed to target specific pain-related beliefs and coping strategies for modification.[26] Rose and Harris [27] have identified cognitive behavioural therapy as a promising intervention to improve the psychological health of persons who are unemployed. Watson and colleagues [28] provided some indications that an occupationally oriented rehabilitation programme consisting of physical exercise and cognitive behavioural training for long-term unemployed

persons with chronic low back pain improved physical fitness as well as increased employment among unemployed participants with health complaints. However, these results were based on an observational study.

There is a need for a randomised controlled trial to investigate the effects of a combined physical exercise and cognitive behavioural programme among unemployed persons with a poor health. In addition, factors that determine non-participation, drop-out and non-compliance in a health promotion programme for unemployed persons need to be addressed.

## 1.5 OBJECTIVES

The objectives of this thesis are threefold:

1. *To study the influence of poor health on entering and maintaining paid employment*
2. *To study the influence of entering paid employment on different dimensions of perceived health.*
3. *To evaluate the effectiveness of a health promotion programme among unemployed persons with health complaints on physical and mental health and re-employment*

## 1.6 DATASETS USED IN THIS THESIS

The analyses of this thesis were based on four different datasets. Two large European longitudinal datasets (SHARE; ECHP) were used for secondary data-analyses. A longitudinal study was conducted to investigate the association between health and re-employment among unemployed citizens of the city of Rotterdam. A randomised controlled trial was conducted to evaluate the effectiveness of a health promotion programme for unemployed persons with health complaints in the city of Rotterdam.

### 1.6.1 Survey on Health and Ageing in Europe (SHARE study)

In chapter 3 the effect of ill health on exit from the labour force among older workers in Europe is investigated on two waves (2004, 2006) of the Survey on Health and Ageing in Europe (SHARE study). The SHARE study is a longitudinal survey that aims to collect medical, social, and economic data on the population aged over 50 years in 11 European Union countries (Sweden, Denmark, The Netherlands, Belgium, Germany, Austria, Switzerland, France, Italy, Spain, and Greece).[11, 12] The first wave of data was collected by interviews between April and October 2004. The overall household

response across the 11 SHARE countries in which data collection took place in 2004 was approximately 62%, although substantial differences among countries were observed. [12] The available dataset from the first wave of data collection (SHARE Release 2.0) contains 28,517 participants, with 12,965 subjects (45%) aged between 50 and 63 years. After two years 8,729 subjects participated again in the questionnaire survey (SHARE Release 1.0), resulting in a response of 67%. Complete information on employment status in 2006 was available for 8,568 subjects. For the longitudinal analysis of the influence of ill health on exit of the labour market, a cohort was available of 4,611 subjects with paid employment in 2004 and complete information on individual and work related characteristics at baseline and work status at follow-up in 2006.

### 1.6.2 European Community Household Panel (ECHP)

In chapter 4 the effect of ill health on transitions between paid employment and various forms of non-employment, including retirement, unemployment, and homemaker, is investigated in five waves (1994-1998) of the European Community Household Panel (ECHP). The ECHP study is a social survey, designed for the member states of the European Union, with a uniform design that allows for adaptation to national requirements. Through its longitudinal design it aims to represent the social dynamics in Europe, from 1994, the year of the first wave, throughout the period that is covered by the subsequent waves. The data were collected by National Institutes for Statistics or research centers, while data checks, weightings and imputations were done centrally by the Statistical Office of the European Communities (Eurostat). All surveys were based on a non-stratified random sampling design. The target population was made up of all national private households. All persons in the panel household were individually interviewed. The data collection was carried out in most countries by paper-and-pencil interviewing, but in four countries (United Kingdom, The Netherlands, Portugal, and Greece) by computer-assisted personal interviewing. The overall household response in the first wave was 72%, but varied considerably among countries. The response in later waves of the ECHP study was higher. A detailed description of sampling procedures and response rates has been published elsewhere.[16, 17]

For the longitudinal analysis of the influence of ill health on entering and maintaining paid employment, two different populations were defined. The first study population included 4446 persons who were unemployed for at least two consecutive years of which 1590 (36%) persons entered the workforce during the last year of follow-up. The second study population consisted of 57436 workers who were employed for at least two consecutive years of which 6191 (11%) persons left the workforce in the last year of follow-up due to unemployment (n=3000), retirement (n=2017), or taking care of the household (n=1174).

### 1.6.3 Re-employment and health dataset

In chapter 5 the association between health and re-employment was studied in a longitudinal study with 6 months follow-up among unemployed persons on social security benefits, who were referred to a re-employment training centre for a re-employment training by the Employment Centre of the City of Rotterdam, The Netherlands. Some of the participants did have chronic health problems, but were declared fit enough to be capable of full time employment after investigation by a physician, a psychologist, and an employment specialist. From December 2004 until December 2007, every week an average of 19 subjects was enrolled in the study. In total, 2754 eligible participants were included in the study. Information about socio-demographic characteristics, health related quality of life (measured by the SF-36), and psychological measures of participants were collected with postal questionnaires and face-to-face interviews in different languages (Dutch, Turkish, Arabic (interview)). At baseline the response was 66% (1829/2754) and after a follow-up period of approximately 6 months the response was 53% (965/1829). Information about start dates of a re-employment training and start and end dates of social security benefits and reasons for ending benefits were derived from registries of the Employment Centre of the City of Rotterdam. Re-employment was defined as leaving the social security benefit services for at least three months because of starting with paid employment, verified by the national Social Security Agency.

### 1.6.4. Randomised controlled trial dataset

In chapter 6 the effectiveness of a health promotion programme among unemployed persons is investigated in a randomized controlled trial. The study population consisted of persons on social security benefits in the City of Rotterdam, who did have chronic health problems, but were declared fit enough to be capable of full time employment after investigation by a physician, a psychologist, and an employment specialist. From December 2004 until December 2007, eligible participants were randomly assigned to the intervention (n= 465) or control group (n=456). Information about socio-demographic characteristics, health related quality of life (measured by the SF-36), psychological measures, work values, and job search activities of participants were collected with postal questionnaires and face-to-face interviews in different languages (Dutch, Turkish, Arabic (interview)). At baseline, the response was 74% (343/465) in the intervention group and 68% (310/456) in the control group. After a follow-up period of approximately 6 months, the response was 51% (176/343) in the intervention group and 48% (150/310) in the control group. Information about start dates of a re-employment training and start and end dates of social security benefits

and reasons for ending benefits were derived from registries of the Employment Centre of the City of Rotterdam.

## 1.7 OUTLINE OF THIS THESIS

Following this general introduction, chapter 2 will describe the association between unemployment and health among different socioeconomic groups. Chapter 3 and 4 will address the first objective of this thesis, i.e. the influence of poor health on entering and maintaining paid employment. Chapter 5 will focus on the second objective of this thesis, i.e. the influence of entering paid employment on different dimensions of perceived health. Chapter 6 and 7 will focus on the third objective of this thesis, i.e. the effectiveness of a health promotion programme among unemployed persons with health complaints on physical and mental health and re-employment.

Chapter 2 presents a cross-sectional study on the association between health and employment status among different socio-economic groups in the City of Rotterdam, the Netherlands. Chapter 3 presents a secondary data-analysis with two waves (2004, 2006) of the SHARE study on the effect of ill health on exit from the labour force among older workers in Europe. Chapter 4 presents a secondary data-analysis with five waves (1994-1998) of the European Community Household Panel (ECHP) on the effect of ill health on transitions between paid employment and various forms of non-employment, including retirement, unemployment and homemaker. Chapter 5 presents a prospective study on the association between health and re-employment among 965 unemployed persons in the City of Rotterdam. Chapter 6 presents a randomised controlled trial to evaluate the effectiveness of a health promotion programme among unemployed persons with health complaints on physical and mental health and re-employment. Chapter 7 presents an observational study to evaluate changes in physical health among participants in a health promotion programme. Chapter 8 discusses the main findings of the previous chapters within the light of the objectives of this thesis. Methodological considerations and recommendations for clinical practice and future research are presented.

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# 2

## **Ethnic differences in unemployment and ill health**

Schuring M, Burdorf A, Kunst AE, Voorham AJJ, Mackenbach JP.

*international Archives of Occupational and Environmental Health* 2009, 82:1023-30.

## ABSTRACT

**Objective:** The aim of the study is to evaluate whether health inequalities associated with unemployment are comparable across different ethnic groups.

**Method:** A random sample of inhabitants of the city of Rotterdam filled out a questionnaire on health and its determinants, with a response of 55.4% (n=2057). In a cross-sectional design the associations of unemployment, ethnicity, and individual characteristics with a perceived poor health were investigated with logistic regression analysis. The associations of these determinants with physical and mental health, measured by the Short Form 36 Health Survey, were evaluated with linear regression analyses. Interactions between ethnicity and unemployment were investigated to determine whether associations of unemployment and health differed across ethnic groups.

**Results:** Ill health was more common among unemployed persons (OR 2.6; 95% CI 1.7-3.8) than workers in paid employment. Health inequalities between employed and unemployed persons were largest among native Dutch persons (OR=3.2) and Surinamese/ Antillean persons (OR=2.6), and smaller in Turkish/Moroccan persons (OR=1.6) and overseas refugees (OR=1.6). The proportions of persons with poor health that could be attributed to unemployment were 14, 26, 14, and 13%, respectively.

**Conclusions:** Differences in ill health between employed and unemployed persons were less profound in ethnic groups compared to the majority population, but the prevalence of unemployment was much higher in ethnic groups. The population attributable fractions varied between 14% and 28%, supporting the argument that policies for health equity should pay more attention to measures that include persons in the labour market and that prevent workers with ill health from dropping out of the workforce.

## INTRODUCTION

The presence of socioeconomic inequalities in health has been widely acknowledged. Lower education, unskilled labour, and a low income are associated with higher mortality and morbidity. [1] Labour force participation is an important determinant of health inequalities, as demonstrated by a higher prevalence of illness.[2] and disability [3] and a higher mortality among unemployed persons.[4] A poor health is strongly associated with non-participation in the labour force, both unemployment and disability.[5-6] The association between health and employment is bi-directional: unemployment may cause poor health (causation hypothesis), and poor health may increase the probability of becoming unemployed (selection hypothesis).[7-8]

Within many countries, substantial inequalities in health between ethnic groups exist.[9-10] The extent to which socioeconomic inequalities underlie ethnic inequalities in health remains debated. Many researchers argue that ethnic inequalities in health are predominantly determined by socioeconomic inequalities.[11-12] Others argue that ethnicity is an independent risk factor for self-reported illness, with an importance equal to risk factors such as social class, age, having a poor social network, not taking regular exercise, and not feeling secure in daily life.[13] When the strength of the relation between socioeconomic status and health varies across ethnic groups, this will have consequences for the extent to which socioeconomic inequalities can underlie ethnic differences in health. A Canadian study found that socioeconomic factors were more important to self-rated health status and presence of chronic illness among immigrants than in non-immigrants [14] There are some indications from a German study that unemployed foreign workers were less satisfied with their health than unemployed Germans.[15] Schuring et al.[8] observed that in countries with a low national unemployment rate a poor health was strongly associated with entering or retaining paid employment, whereas in countries with a high national unemployment rate the effect of a poor health on selection in and out of the workforce was much smaller. A possible explanation is that with high unemployment various factors determine labour opportunities, such as education, training, and age, and that a poor health only plays a minor role relative to these socio-demographic factors.[16] With low unemployment persons of all age and educational level are retained in the workforce and, thus, the influence of a poor health becomes more prominent. This reasoning would imply that, within a given country, among those groups with high unemployment, such as minority groups, socio-demographic factors will exceed the importance of health. Hence, a high unemployment rate in minority groups may mask the association between health and employment status in these groups.

In order to better understand the relation between ethnicity, socioeconomic status and health, it is important to assess whether socioeconomic status is associated with

health in a similar way across ethnic groups. In this paper we examine the associations between unemployment and health in the three largest ethnic minority groups of the Netherlands and the indigenous population. The aims of the study were (1) to evaluate whether the associations between poor health and employment status are less strong among ethnic groups with high unemployment than among Dutch persons, and (2) to assess the differences in proportions of unemployment attributed to poor health.

## METHODS

### Population

Between March and June 2003 a health questionnaire survey was undertaken by the municipal health service of Rotterdam in a random sample of 6404 inhabitants of the city of Rotterdam, aged 16 to 84.[17] A questionnaire was sent to the home address, followed by two reminders two and four weeks later, respectively. A total of 3406 subjects returned the questionnaire (response 55.4%). Those respondents who were aged between 16 and 65 years old and not engaged as student in a secondary or tertiary educational programme were selected for the current study with a cross-sectional design. A total of 2057 subjects met these inclusion criteria.

### Socio-demographic variables

The socio-demographic variables included in this study were labour force participation, ethnic background, highest educational level, age, sex, and marital status. In this study, labour status was based on self-reported current economic status with five mutually exclusive categories: full-time employment (>32 h/week), part-time employment (< 32 h/week), unemployment, disability pension, and homemaker.

The ethnic background of the respondent was based on the country of origin of the mother. In case the mother was born in The Netherlands, the country of birth of the father was leading.[18] Different ethnic groups were defined, based on differences in experiences of migration (refugees or labour migrants) and differences in geographical and cultural distance from the Netherlands. Three ethnic minority groups were defined: (1) Turks and Moroccans, (2) Antilleans and Surinamese, and (3) refugees. Turks and Moroccans initially came as labour migrants to the Netherlands from the early 1960s, while the migration of Surinamese and Antilleans/Arubans is related to the colonial past. Refugees are another important group of migrants from designated countries Afghanistan, Algeria, Angola, Bosnia, China, Chile, Croatia, Democratic Republic of the Congo, Eritrea, Hong Kong, Iran, Iraq, Kosovo, Liberia, Nigeria, Sedan,

Serve, Sierra Leone, Somalia, South Korea, Syria, or former-Yugoslavia. Immigrants from other countries were not included in the analysis (n=296).

Subjects were divided into three groups according to their highest level of educational attainment. A high educational level was defined as higher vocational training or university, intermediate educational level was defined as higher secondary schooling or intermediate vocational training, and low educational level was defined as no education, primary school, lower and intermediate secondary schooling or lower vocational training. Marital status was used to distinguish those subjects married or living together with others.

### Health measures

Self-reported health (SRH) was measured by asking subjects to rate their overall health on a five-point scale, ranging from 'excellent', very good', 'good' and 'fair' to 'poor'. Those reporting less than 'good health' were defined as having a poor health. [16] Health was also measured with the Dutch version of the Short Form 36 Health Survey (SF-36).[19] The SF-36 consists of 36 items that were used to calculate scores on eight dimensions: physical functioning, general health, mental health, bodily pain, social functioning, vitality, role limitation due to emotional health problems, and role limitation due to physical health problems. Scores could range from 0 to 100, with a higher score indicating a better health related quality of life.

### Statistical analysis

Characteristics of subjects were analyzed using descriptive statistics. For two subscales of the SF-36, role limitations due to physical health problems and role limitations due to emotional health problems, a strong ceiling effect existed and the variables were not normally distributed. Therefore, these subscales were excluded from further analysis.

The statistical analysis was conducted on the study population with complete information on all variables included in the multivariate analyses. Since educational level was not available for 207 subjects (10%) and for other variables a few missing values occurred, the number of subjects in the analyses may vary slightly. The associations between unemployment, ethnicity and other socio-demographic characteristics and perceived poor health were investigated with logistic regression analysis, with the odds ratio (OR) as measure of association. The analysis started with univariate logistic regression models to determine which independent variables were of interest to consider in the final model. Variables with a P value of at least 0.10 were selected for further analysis. A multivariate logistic regression analysis was conducted to determine the association of employment status, ethnic background, sex, age, educa-

tional level, and marital status with the dichotomous outcome measure of poor health. Explanatory variables were included into the main model one by one by a forward selection procedure, in order of magnitude of explained variance in the univariate analyses, and independent variables with a P value of at least 0.05 were retained in the model. Interaction effects between ethnicity and unemployment were analyzed in order to determine whether the effects of unemployment on health differed across ethnic groups. The proportion of persons with poor health that theoretically could be attributed to unemployment was calculated with the population attributable fraction, expressed by the formula  $PAF\% = 100 \times [p \times (OR-1)] / [1 + p \times (OR-1)]$ , whereby p is the proportion of unemployed persons and the OR is the association between unemployment and poor health.[20]

**Table 2.1** Characteristics and perceived health of subjects with different ethnic backgrounds in a community-based health survey in the Netherlands (n=2057)

	Dutch N=1448	T/M N=228	S/A N=281	Refugee N=100
Women	808 (55.9%)	119 (52.2%)	170 (60.5%)	50 (50.0%)
Age*				
18-24 yr	96 (6.6%)	34 (14.9%)	39 (13.9%)	13 (13.0%)
25-44 yr	662 (45.7%)	137 (60.1%)	145 (51.6%)	54 (54.0%)
45-54 yr	347 (24.0%)	31 (13.6%)	68 (24.2%)	19 (19.0%)
55-65 yr	343 (23.7%)	26 (11.4%)	29 (10.3%)	14 (14.0%)
Married*	882 (61.8 %)	168 (74.3%)	113 (40.8%)	56 (57.1%)
Educational level*				
High	394 (28.7%)	10 (6.3%)	24 (10.0%)	18 (22.5%)
Intermediate	350 (25.5%)	42 (26.4%)	59 (24.7%)	30 (37.5%)
Low	628 (45.8%)	107 (67.3%)	156 (65.3%)	32 (40.0%)
Missing	76	69	42	20
Employment status*				
Employed >32 h/wk	812 (56.1%)	83 (36.4%)	139 (49.5%)	51(51.0%)
Employed <32 h/wk	289 (20.0%)	28 (12.3%)	56 (19.9%)	13 (13.0%)
Unemployed	111 (7.7%)	60 (26.3%)	63 (22.4%)	25 (25.0%)
Disability pension	111 (7.7%)	14 (6.1%)	13 (4.6%)	3 (3.0%)
Homemaker	125 (8.6%)	43 (18.9%)	10 (3.6%)	8 (8.0%)
Poor health*	261 (18.1%)	97 (42.7 %)	88 (31.7 %)	21 (21.0%)
General health*	70.1 (19.7)	55.7 (22.8)	63.3 (20.6)	65.5 (19.5)
Physical functioning*	87.4 (19.9)	69.1 (27.0)	78.8 (25.8)	79.2 (26.3)
Social functioning*	81.7 (23.2)	69.4 (24.7)	73.7 (27.2)	75.9 (24.6)
Bodily pain*	78.7 (24.2)	65.1 (28.3)	72.2 (26.6)	73.5 (24.7)
Vitality*	62.6 (19.2)	50.6 (18.0)	54.9 (18.9)	55.0 (18.9)
Mental health*	73.9 (17.6)	61.8 (18.8)	68.3 (20.6)	66.4 (18.0)
Role limitations, physical*	80.2 (34.5)	66.3 (36.9)	77.5 (35.0)	80.6 (31.6)
Role limitations, emotional*	84.7 (32.1)	69.8 (39.6)	78.8 (37.2)	81.4 (33.8)

\* chi-square test  $P < 0.05$ , comparing minority groups to the native Dutch population



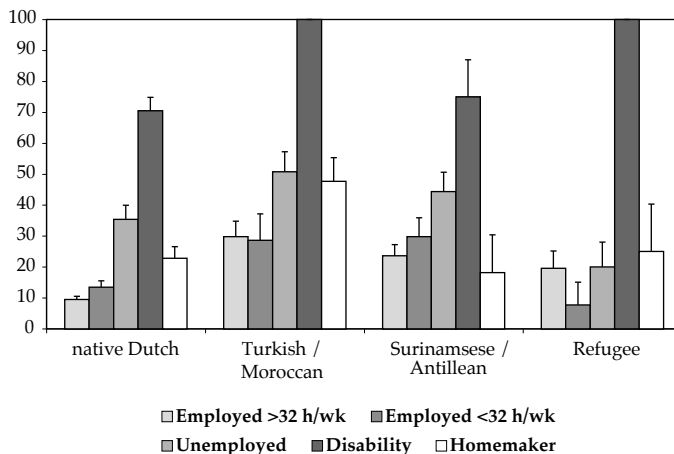
The associations of labour status, ethnicity, and other socio-demographic characteristics with physical and mental health were investigated with multiple linear regression analysis, with as dependent variables the scores on the six subscales of the SF-36; general health, physical health, bodily pain, mental health, social functioning, and vitality.

All statistical analyses were performed with the statistical package SPSS 11.0 for Windows.

## RESULTS

Characteristics of subjects are presented in Table 2.1, stratified by ethnic background. Immigrant subjects were younger of age, more often unemployed and, with the exception of refugees, lower educated than native Dutch subjects. Subjects with a Turkish or Moroccan background were more often married and homemaker compared with the other ethnic groups. Health status was lower in migrants than native Dutch subjects for most dimensions of health. Turkish and Moroccan subjects had the worst health, whereas the health status of refugees resembled that of native Dutch subjects for some dimensions of health.

Figure 2.1 shows that within each ethnic group, with the exception of refugees, unemployed subjects had a worse health than employed subjects. Subjects with a



**Figure 2.1** Perceived health of subjects with different ethnic backgrounds in a community-based health survey in the Netherlands (n=2057) specified for different categories of labour force participation or being out of the workforce

disability pension had the worst health in every ethnic group. Among subjects with a Turkish or Moroccan background the health status of homemakers was equal to the health status of unemployed subjects.

Table 2.2 shows that all socio-demographic variables in this study were included in the multivariate model. Migrants more often had a poor health than native Dutch subjects, even after adjusting for age, sex, educational level, marital status, and labour force participation. The health status of Turkish or Moroccan subjects was the worst (OR=3.9 (2.6-6.0)), whereas the health status of refugees was not significantly different (OR=1.8 (0.9-3.3)) from that of native Dutch subjects.

**Table 2.2** Associations between demographic factors and employment status with poor health of subjects with different ethnic backgrounds in a community-based health survey in the Netherlands (n=1815) by multivariate logistic regression analysis

	N	OR (95% CI)
Native Dutch	1346	1.0
Turkish/Moroccan	157	3.9 (2.6-6.0)
Surinamese/Antillean	233	2.5 (1.7-3.6)
Refugee	79	1.8 (0.9-3.3)
Age		
18-24 yr	143	1.0
25-44 yr	886	2.4 (1.3-4.3)
45-55 yr	417	5.5 (2.9-10.4)
55-64 yr	369	4.7 (2.5-9.1)
Women	1016	1.6 (1.2-2.1)
Educational level		
High	443	1.0
Intermediate	473	1.6 (1.0-2.5)
Low	899	3.2 (2.1-4.9)
Married	1106	1.4 (1.0-1.8)
Employment status		
Employed >32 h/wk	996	1.0
Employed <32 h/wk	349	1.0 (0.7-1.5)
Unemployed	194	2.6 (1.7-3.8)
Disability pension	119	14.4 (8.8-23.6)
Homemaker	157	1.1 (0.7-1.8)

OR odds ratio, CI confidence interval

Table 2.3 describes the associations with health-related quality of life, which resembles the pattern observed for a perceived poor health in table 2. All migrant groups had significantly lower scores for the physical as well as the mental health dimensions of the SF36 than the native Dutch group, indicating a poorer health. Unemployed persons and persons receiving a disability pension had significantly lower scores for all dimensions of physical and mental health compared with employed persons. The magnitude of these differences was comparable to the observed differences in health across age and education.

**Table 2.3** Associations between demographic factors and employment status with health related quality of life (six subscales of the SF-36) of subjects with different ethnic backgrounds in a community-based health survey in the Netherlands (n=1845) by multivariate linear regression analysis

	General health	Physical functioning	Bodily pain	Mental health	Social functioning	Vitality
Intercept	81.8 (2.3)	102.4 (2.4)	100.0 (2.9)	82.9 (2.2)	97.5 (2.8)*	77.5 (2.3)*
Native Dutch	0	0	0	0	0	0
Turkish/Moroccan	-11.0 (1.6)*	-13.1 (1.7)*	-9.6 (2.0)*	-8.2 (1.5)*	-9.5 (2.0)*	-7.3 (1.6)*
Surinamese/ Antillean	-6.5 (1.4)*	-8.2 (1.4)*	-5.0 (1.7)*	-3.9 (1.3)*	-7.3 (1.6)*	-5.5 (1.4)*
Refugee	-4.5 (2.2)*	-7.0 (2.3)*	-6.5 (2.7)*	-5.9 (2.0)*	-6.6 (2.6)*	-7.5 (2.1)*
Age						
18-24 yr	0	0	0	0	0	0
25-44 yr	-1.7 (1.7)	1.0 (1.7)	-2.2 (2.1)	-0.2 (1.6)	-2.4 (2.0)	-3.5 (1.6)*
45-54 yr	-5.5 (1.8)*	-4.2 (1.9)*	-7.1 (2.3)*	-0.3 (1.7)	-3.9 (2.2)	-3.0 (1.8)
55-64 yr	-6.6 (1.9)*	-6.0 (1.9)*	-4.9 (2.3)*	-1.6 (1.8)	-2.7 (2.3)	-2.5 (1.8)
Women	-1.4 (1.0)	-2.9 (1.0)*	-6.6 (1.2)*	-2.8 (0.9)*	-4.9 (1.2)*	-4.3 (1.0)*
Educational level						
High	0	0	0	0	0	0
Intermediate	-1.9 (1.2)	-1.9 (1.3)	-3.5 (1.5)*	-0.5 (1.1)	-1.0 (1.5)	-1.3 (1.2)
Low	-6.1 (1.2)*	-8.7 (1.2)*	-7.2 (1.5)*	-4.4 (1.1)*	-4.0 (1.4)*	-6.1 (1.1)*
Employment status						
Employed >32 h/wk	0	0	0	0	0	0
Employed <32 h/wk	0.2 (1.2)	-1.1 (1.3)	-0.3 (1.6)	-0.1 (1.2)	-1.3 (1.5)	-1.1 (1.2)
Unemployed	-7.7 (1.5)*	-4.7 (1.6)*	-8.8 (1.9)*	-10.5 (1.4)*	-9.3 (1.8)*	-7.3 (1.5)*
Disability pension	-28.3 (1.9)*	-33.2 (2.0)*	-29.3 (2.3)*	-16.1 (1.8)*	-31.9 (2.3)*	-19.3 (1.9)*
Homemaker	-1.0 (1.8)	-3.1 (1.9)	-0.09 (2.2)	0.6 (1.7)	1.0 (2.1)	0.04 (1.7)

\* P<0.05

The interaction between employment status and ethnic background had a significant contribution to the logistic regression model ( $\chi^2 = 10.4$ ;  $df = 3$ ;  $p = 0.018$ ), demonstrating that the associations between employment status and health varied within ethnic groups (Table 2.4). Health inequalities between employed and unemployed subjects were largest among the Dutch subjects (OR=3.2 (1.9-5.4)), followed by Surinamese and Antilleans (OR=2.6 (1.3-5.2)), and less pronounced among Turkish/Moroccan subjects (OR=1.6 (0.7-3.7)) and refugees (OR=1.6 (0.4-6.2)). The PAF of unemployment in poor health was 14% among Dutch, 26% in Surinamese and Antilleans, 14% among Turkish and Moroccan, and 13% among refugees.

## DISCUSSION

Ill health was substantially more common among unemployed persons than workers in paid employment. Health inequalities associated with employment differed within ethnic groups, with the strongest association between employment and health for

**Table 2.4** Associations between unemployment and poor health within different ethnic backgrounds in a community-based health survey in the Netherlands (n=1558)

	OR (95% CI)
Age	
18-24 yr	1
25-44 yr	1.9 (1.1-3.6)
45-55 yr	4.2 (2.3-8.0)
55-64 yr	4.1 (2.2-7.9)
Women	1.6 (1.2-2.2)
Educational level	
High	1
Intermediate	1.8 (1.1-3.1)
Low	3.7 (2.3-6.0)
Native Dutch	1
Turkish/Moroccan	4.3 (2.4-7.4)
Surinamese/Antillean	2.8 (1.8-4.3)
Refugee	2.0 (0.9-4.1)
Effect of unemployment within ethnic group:	
Native Dutch	3.2 (1.9-5.4)
Turkish/Moroccan	1.6 (0.7-3.7)
Antillean/Surinamese	2.6 (1.3-5.2)
Refugee	1.6 (0.4-6.2)

Employed (full-time and part-time) and unemployed persons were included, whereas homemakers and disabled persons (n=327) were not included in this analysis. OR odds ratio, CI confidence interval

native Dutch persons, followed by Surinamese and Antilleans and a less pronounced association between employment and health for Turkish/Moroccan persons and refugees. The population attributable fraction varied between 13% and 26%, indicating that employment status is an important factor in socioeconomic health inequalities.

The design of this study was cross-sectional, and therefore no assumption can be made about the direction of the association between poor health and unemployment among migrant groups. Unemployment may cause poor health and poor health may increase the probability of becoming unemployed.[7-8] Another limitation of this study was the lack of information on non-respondents. With respect to unemployment in the study population, the proportion of unemployed persons within each ethnic group resembled closely the registered unemployment in the city of Rotterdam and, thus, response does not seem biased towards employed or unemployed persons.

In this study ethnic groups reported higher prevalences of poor health and also lower scores on health-related quality of life. There is a widespread agreement that a single question asking subjects to rate their overall health on a scale from excellent to poor provides a useful summary of how subjects perceive their overall health status.[16] However, the validity of this single-item question in subjects with different cultural backgrounds has been questioned.[21] Differences in self-concepts between ethnic groups may influence the results of the single item general health question. The

observation that after adjusting for the well-established socio-demographic determinants of health inequalities, still systematic differences in occurrence of poor health in ethnic groups relative to the Dutch group were observed, may indicate over-estimation of poor health. In the current study similar conclusions on unemployed, ethnicity, and health were drawn when using the single question on perceived general health question and the other 35 questions on physical and mental health dimensions of the SF36. This corroborates the opinion that the general health question provides a good summary of the mental and physical health in migrant groups and the indigenous population. This finding is, of course, also supported by the high correlations between perceived general health and all health dimensions in the SF-36.

A high proportion of persons with a poor health among ethnic groups has been observed in various studies in different countries.[9-13] Different explanations have been put forward. A Swedish study among immigrants from Poland, Turkey, and Iran found that acculturation (defined by the knowledge of the Swedish language) was an important mediator in the pathway between ethnicity and poor health.[22] Indeed, in our study population differences in mastering the Dutch language may have influenced health. For Surinamese and Antilleans Dutch is usually a first or second language, whereas for Turks and Moroccans knowledge of the Dutch language is often limited or absent, especially among older women. Language problems may hamper effective communication with physicians and also inhibit access to information on health and health care.[23] In the current study, mastery of the Dutch language was not included in the analyses, but the observation that the health status of homemakers with a Turkish or Moroccan background was worse than the health status of homemakers with another ethnic background may reflect a lower acculturation.

Differences in migration experiences may also contribute to the differences in health between the ethnic minority groups. Refugees have a different migration history than Turks, Moroccans, Surinamese, and Antilleans. For refugees, experiences of violence, the flight for asylum and forced broken social networks may have affected health.[13] However, in this study we found that refugees had a relatively good health compared with the other ethnic minority groups. The relatively good health of refugees can partly be explained by the relatively high educational level of refugees relative to the other ethnic minority groups.

Employed migrants are still concentrated in blue collar jobs in industry.[15] Especially for employed refugees, who have a relatively high educational level (87% intermediate/high educated) compared to the employed native Dutch (77% intermediate/high educated), adverse health effects of unsatisfactory jobs have been suggested (Smith 2000). An Australian study has shown that unsatisfactory jobs can be as depressing as unemployment.[24] Unfortunately, information about the potential misfit between personal capabilities and job requirements was not collected in the current study.

It was hypothesized that the associations of poor health and employment status would be less profound in ethnic groups with a high prevalence of unemployment compared to the Dutch population. When the unemployment rate is high, the effect of health selection out of the workforce is relative small compared to other factors that determine labour opportunities for people.[16] In general, our results indeed showed that the association between unemployment and poor health was strongest in the Dutch population (OR = 3.2) with the lowest unemployment, whereas the associations between unemployment and health were less profound in ethnic minority groups (ORs between 1.6 and 2.6), which were characterised by a higher unemployment level. In the current study the logistic regression analysis showed that the association between unemployment and health was not statistically significant within the Turkish/Moroccan group. However, when adjustment for sex and educational level did not take place, a significant association between unemployment and health (OR=2.5) was found. Hence, the absence of health inequalities across employment status within this ethnic group may be explained by the strong correlations between sex and employment status and between educational level and employment status. These additional analyses showed that especially female, low educated Turkish/Moroccan persons were often unemployed and also reported the highest occurrence of a poor health.

The PAF of unemployment in poor health within the four ethnic groups varied between 13% among refugees to 26% among Surinamese/Antillean subjects. The PAF values among Dutch persons (14%) was strongly influenced by the high OR for unemployment, whereas the PAF values among the ethnic minority groups were more influenced by the high prevalence of unemployment. Although this cross-sectional study does not permit conclusions on causality, these findings suggest that, under the assumption that unemployment leads to a poor health, health inequalities related to unemployment are a major public health problem in all ethnic groups. Thus, policies for health equity should pay more attention to measures that include persons with a poor health in the labour market and that prevent workers with ill health from dropping out of the workforce.

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# 3

## **The impact of ill health on exit from paid employment in Europe among older workers**

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## ABSTRACT

**Objective:** To determine the impact of ill health on exit from paid employment in Europe among older workers.

**Methods:** Participants of the Survey on Health and Ageing in Europe (SHARE) in 11 European countries in 2004 and 2006 were selected when between 50 and 63 years old and in paid employment at baseline (n=4611). Data were collected on self-rated health, chronic diseases, mobility limitations, behavioural factors (obesity, smoking, alcohol use, and physical activity), and work characteristics. Participants were followed for two years and classified into employed, retired, unemployed, and disabled at end of follow-up. Multinomial logistic regression was used to estimate the effect of different measures of ill health on exit from paid employment.

**Results:** During the two-year follow-up period, 17% of employed workers quit paid employment, primarily due to early retirement. Controlling for individual and work related characteristics, poor self-perceived health was strongly associated with exit from paid employment due to retirement, unemployment, or disability (ORs from 1.32 to 4.37). Adjustment by work related factors and lifestyle reduced the significant associations between ill health and exit from paid employment by 0 to 18.7%. Low education, obesity, low job control, and effort-reward imbalance were associated with measures of ill health, but also risk factors for exit from paid employment after adjustment for ill health.

**Conclusion:** Poor self-perceived health was strongest associated with exit from paid employment among European workers aged 50-63 years, compared to three other measures of ill health. This study suggests that the effects of ill health on exit from paid employment can be diminished by a variety of preventive measures towards obesity, problematic alcohol use, job control, and effort-reward balance.

## INTRODUCTION

In many industrialized countries the population is ageing, due to increasing life expectancy and falling birth rates.[1] A rather paradoxical development is that, despite increases in life expectancy, the average time people spend in paid work has decreased in most European countries. Although part of this decrease is explained by prolonged education among younger cohorts, a more important contributor is the higher rate of exit from the labour market at older ages.[2] As a consequence, many countries are developing policies to encourage older workers to remain longer in the labour market and delay retirement.[3] Clearly, the success of these policies will depend on a better understanding of ageing in the workforce and the particular role of health and work characteristics in continuing work or exit from the labour market. Recent evidence suggests that work can be good for health, reversing the harmful effects of long-term unemployment and prolonged sickness absence.[4] However, the current assumption seems that illness is incompatible with being in work. [4]

There is ample evidence that ill health may cause exit from the labour force.[3, 5-10] The earliest studies focused on poor health as risk for unemployment, for example in construction workers, whereby several health problems predicted the risk of long-term unemployment.[6] More recently, there is an increasing awareness that among older workers ill health does not only affect unemployment and disability, but may also drive selection out of the workforce due to early retirement and staying home to take care of the family.[3, 10] For example, in a Finnish cohort of male workers with 11 year follow-up, self-assessed poor health was a strong predictor of both enrolment into disability benefit as well as non-illness based early retirement.[7] On the European level it was shown that ill health was a risk factor for transitions between paid employment and various forms of non-employment, including retirement, unemployment, and taking care of the household.[5, 9]

However, it remains unclear which type of health measure is most predictive for future exit, and how large the direct effect of poor health is on future exit. The aim of the study is to explore the role of ill health in exit from paid employment. The following research questions were formulated. First, which measures of health are predictive for exit from paid employment? Second, how much of the observed associations between ill health and future exit can be explained by work related factors and lifestyle?

## METHODS

### Study population

The study population consisted of participants of the Survey on Health and Ageing in Europe (SHARE study). SHARE is a longitudinal survey that aims to collect medical, social, and economic data on the population aged over 50 years in 11 European Union countries (Sweden, Denmark, The Netherlands, Belgium, Germany, Austria, Switzerland, France, Italy, Spain, and Greece).[11-12] In the participating SHARE countries the institutional conditions with respect to sampling were so different that a uniform sampling design for the entire project was not feasible. Different registries of national or local level were used that permitted stratification by age. The sampling designs varied from simple random selection of households to complicated multistage designs.

The first wave of data was collected by interviews between April and October 2004. The overall household response across the 11 SHARE countries in which data collection took place in 2004 was 57.4%, although substantial differences among countries were observed.[12] The available dataset from the first wave of data collection (SHARE Release 2.0) contains 28,517 participants, with 12,965 subjects (45%) aged between 50 and 63 years. Individuals aged 63 years and older were excluded from the current study, since it was assumed that workers normally retired when they became 65 years old at the end of follow-up. While this assumption certainly has limitations, given the complexity to define retirement at the individual level and the small proportion of workers above the age of 63 years in the study population (about 2%), it was considered to be the definition that was most comparable across countries. For 93 persons employment status was unknown, resulting in a study population of 12,872 subjects, of which 7119 (55%) subjects with paid employment. After two years 8,729 subjects participated again in the questionnaire survey (SHARE Release 1.0), resulting in a response of 67%. Complete information on employment status in 2006 was available for 8,568 subjects. For the longitudinal analysis of the influence of ill health on exit of the labour market, a cohort was available of 4,611 subjects with paid employment in 2004 and complete information on individual and work related characteristics at baseline and work status at follow-up in 2006.

### Labour force participation

The outcome of this study is work status, which was based on self-reported current economic status that best described respondent's situation based on four mutually exclusive categories: paid work, retired, unemployed, disabled. The definition of being employed in SHARE encompasses all individuals who declared to have done any

kind of formal paid work in the last four weeks, including self-employed work for family business. Unemployed were those who were laid off from their last job before being able to benefit from normal pension benefits, and therefore were forced to spend some time in unemployment before effectively being retired. Sickness or disability insurance applied to people who exited the labour force for reasons of recognized health problems.[11] The category of disabled participants predominantly includes persons whose health problems at work were an eligibility criterion for receiving a disability pension. Total exit from the workforce was defined as exit either through early retirement, unemployment or disability.

### Health measurements

The European version of self-perceived health, a 5-point scale question ranging between very good to (very) bad, was used to define poor health (less than good). This frequently used question has been shown to be a good indicator of general physical and mental health.[13-14] A second health measure was having at least one of the following chronic diseases diagnosed by a doctor during lifetime; heart disease, stroke, diabetes, lung disease, asthma, arthritis or rheuma, and osteoporosis. Functional limitations, reflecting the ability of individuals to perform normally in society, were characterized with two dichotomous measures of health. The first measure of interest, mobility problems, reflects limitations with mobility, arm or fine motor functions. Mobility problems were defined as one or more affirmative answers on a list of 10 mobility problems, such as walking 100 meters and reaching or extending arms above shoulder level. The second measure, instrumental limitations, was positive for subjects with one or more of the 13 instrumental activities of daily life, such as preparing meals and making phone calls.

### Individual characteristics

The highest education successfully completed was coded according to the 1997 International Standard Classification of Education (ISCED-97) and categorized into low (pre-primary, primary and lower secondary education), intermediate (upper secondary education) and high (post secondary education). Body mass index (BMI) was calculated by dividing body weight in kilogram by the square of body height in meters. BMI was recoded into normal ( $<25 \text{ kg/m}^2$ ), overweight ( $\geq 25$  and  $<30 \text{ kg/m}^2$ ), or obese ( $\geq 30 \text{ kg/m}^2$ ). Marital status was used to categorize individuals into those who were living with a spouse or a partner in the same household (reference category) and those living alone. Smokers were subjects who were currently smoking; all others were categorized as non-smokers. Problematic alcohol use was defined by an alcohol consumption of two or more glasses of alcoholic beverage at least 5 days a

week in the last six months. Physical activity was measured with single questions on regular participation in moderate activities and vigorous activities, both on a 4-point scale ranging from 'more than once a week' to 'hardly ever, or never'. Those who reported less than once a week moderate or vigorous activity were considered to lack in leisure-time physical activity.[12]

### Work related characteristics

Work related characteristics were assessed by a short battery of items derived from (i) the Job Content Questionnaire measuring the demand-control model [15] and (ii) the effort-reward imbalance model questionnaire [16]. All items were on a four point scale ranging from 1 'strongly agree' to 4 'strongly disagree'. Single item measured high time pressure ("I'm under constant time pressure due to a heavy work load.") Lack of job control was measured by the sum score of two items ("I have very little freedom to decide how I do my work", "I have an opportunity to develop new skills"). Country-specific median values were used to define the presence of high time pressure, and lack of job control.

Effort-reward imbalance was measured by 2 items on 'effort' ('physically demanding' and 'time pressure') and 5 items on 'reward' ('receive adequate support', 'receive recognition', 'adequate salary', 'job promotion prospects', 'job security'). 'Effort-reward imbalance' was defined by the ratio of the sum score of the 'effort' items and the sum score of the 'reward' items, adjusted for the number of items.[17] Effort-reward imbalance was defined as a score within the upper tertile of this ratio per country.[17]

A high physical work demand was measured with one item ("My job is physically demanding."). Country-specific median value was used to define the presence of high physical work demand.

### Statistical analysis

Logistic regression was used to evaluate cross-sectional associations at baseline between four measures of ill health as dependent variables and individual and work characteristics as independent variables, adjusting for country.

Risk factors for exit from paid employment during the two year follow-up were evaluated by means of a multinomial logistic regression analysis. The study population consisted of subjects with paid employment at baseline and odds ratios were calculated for the likelihood of transition to every state of non-participation, i.e. early retirement, unemployment, and disability during the 2 year follow-up. The results for homemakers were not shown as this group was highly dominated by female gender, but subjects who exited paid employment through becoming a home worker remained in the sample. The first step in the analysis was to establish univariate associations be-

tween the dependent variable work status, and health measures, socio-demographic factors, lifestyle factors, and work characteristics as independent factors, including country as fixed effect. In the second step multivariate analyses were conducted to model employment status at the end of follow-up as a function of four measures of health. For the initial selection of potential covariates for the multivariate model, univariate associations with a significant level of  $p < 0.05$  were considered. For each independent variable measure of health, we calculated odds ratios for dependent variable exit for work, adjusted for age, sex and education (reference model) and further adjusted for lifestyle factors and work related characteristics separately, and in combination. For each regression model the percentage change in odds ratio of each

**Table 3.1** Individual characteristics, lifestyle factors, health status, and work characteristics among 4611 employed persons aged 50-63 years old in 11 European countries during the first wave of the Survey on Health and Ageing in Europe (SHARE)

	Employed (n=4611)
Individual characteristics	
Female	45% (2088)
Age	
50-54 yr	48% (2224)
55-59 yr	40% (1826)
60-63 yr	12% (561)
Education level	
Low	31% (1443)
Intermediate	33% (1513)
High	36% (1655)
Living without partner	20% (937)
Lifestyle factors	
BMI	
<25 kg/m <sup>2</sup>	44% (2011)
25-30 kg/m <sup>2</sup>	41% (1910)
≥30 kg/m <sup>2</sup>	15% (690)
Current smoker	27% (1252)
Problematic alcohol use	14% (664)
Lack of leisure-time physical activity	56% (2561)
Work-related factors	
High time pressure at work (1/0)	56% (2567)
High physical work demands (1/0)	46% (2138)
Lack of job control (1/0)	57% (2622)
Effort-reward imbalance at work (1/0)	33% (1531)
Perceived health	
Very good	32% (1475)
Good	51% (2343)
Fair	15% (708)
(Very) bad	2% (85)
Chronic disease (1/0)	25% (1130)
Mobility problems (1/0)	28% (1287)
Instrumental limitations in daily activities (1/0)	4% (170)

pathway of exit was calculated  $(100 \times [\text{OR}_{\text{reference model}} - \text{OR}_{\text{+explanatory factors}}] / [\text{OR}_{\text{reference model}} - 1])$ . [18] One of the main advantages of this method is that it can be used to estimate direct and indirect contributions of explanatory factors. One limitation is that the percentage change can be similar for different absolute changes in odds ratios. However, all contributions were calculated relatively to the same odds ratios, which were also presented. Therefore, we believe that this limitation has a limited effect on our results.

Population Attributable Fractions were calculated for significant determinants of exit from paid employment, using the formula  $\text{PAF} = \text{Pe} (\text{OR}-1) / (1+\text{PE}(\text{OR}-1))$ [19], whereby Pe represents the prevalence of exposure in the study population.

All statistical models were based on the number of persons with complete data available. The statistical analyses were carried out with SPSS version 15.0.[20]

## RESULTS

About 17% of the employed workers reported less than good health (table 3.1). Interrelations of the four health measures were moderate, with Spearman correlations varying from 0.06 to 0.33. In total, 55% of the subjects with a poor health had a chronic disease, 57% mobility problems, and 9% instrumental limitations. Chronic diseases with highest prevalence were depression (17.7% n=814), arthritis/osteoporosis (12.3% n=565), and respiratory diseases (5.7% n=265)(data not shown). About 61% of subjects with a chronic disease perceived their health as good.

**Table 3.2** Exit from paid employment among 4611 participants aged 50-63 years old in 11 European countries during two years follow-up during the first two waves of the Survey on Health and Ageing in Europe (SHARE)

Employed in 2004		Labour market position 2006				
Country	N	Employed	Retired	Unemployed	Disabled	Homemaker
Sweden	720	88.5% (637)	5.8% (42)	1.7% (12)	3.3% (24)	0.7% (5)
Denmark	409	81.2% (332)	13.0% (53)	3.9% (16)	1.7% (7)	0.2% (1)
The Netherlands	484	79.8% (386)	12.6% (61)	2.1% (10)	2.3% (11)	3.3% (16)
Belgium	617	84.8% (523)	8.8% (54)	0.8% (5)	3.4% (21)	2.3% (14)
Germany	411	76.6% (315)	12.9% (53)	7.1% (29)	1.0% (4)	2.4% (10)
Austria	209	71.8% (150)	23.0% (48)	2.9% (6)	1.4% (3)	1.0% (2)
Switzerland	238	88.2% (210)	5.5% (13)	2.5% (6)	0.4% (1)	3.4% (8)
France	490	80.4% (394)	12.7% (62)	3.9% (19)	2.2% (11)	0.8% (4)
Italy	276	72.1% (199)	19.2% (53)	4.3% (12)	0.4% (1)	4.0% (11)
Spain	228	80.7% (184)	7.0% (16)	4.8% (11)	2.6% (6)	4.8% (11)
Greece	529	92.1% (487)	5.1% (27)	0.2% (1)	0.2% (1)	2.5% (13)
Total	4611	82.8% (3817)	10.5% (482)	2.8% (127)	2.0% (90)	2.1% (95)



During the two year follow-up period 17% (n=794) of employed workers exited the workforce, primarily due to retirement (11%) (table 3.2). Considerable differences in prevalence of exit from paid employment and pathways of exit were found between countries. At baseline all four measurements of ill health were associated with low education (OR's 1.27-2.00) (table 3.3). Obesity (ORs 1.53-2.74) and lack of physical activity in leisure time (ORs 1.24-1.87) were associated with most health outcomes. Effort-reward imbalance at work was increased for all four health outcomes (ORs 1.25-1.64). High time pressure (ORs 0.98-1.09), and problematic alcohol use (ORs 0.87-1.12) were not associated with any of the health outcomes.

**Table 3.3** Cross-sectional multivariate associations between individual characteristics, lifestyle and work characteristics, and different health outcomes among 4611 employed persons aged 50-63 years old in 11 European countries, during the first wave of the Survey on Health and Ageing in Europe (SHARE)

	Less than good perceived health (N=793)	Chronic disease (N=1130)	Mobility problems (N=1287)	Instrumental limitations in daily activities (N=170)
	OR 95%CI	OR 95%CI	OR 95% CI	OR 95% CI
Age				
50-54 yr	1	1	1	1
55-59 yr	1.24* (1.04-1.47)	1.55* (1.33-1.79)	1.21* (1.05-1.40)	1.33 (0.95-1.85)
60-63 yr	1.35* (1.06-1.73)	1.72* (1.39-2.13)	1.43* (1.16-1.77)	1.40 (0.86-2.29)
Educational level				
High	1	1	1	1
Intermediate	1.55* (1.26-1.90)	1.21* (1.02-1.44)	1.22* (1.03-1.44)	1.34 (0.90-2.03)
Low	2.00* (1.62-2.47)	1.30* (1.08-1.58)	1.27* (1.06-1.51)	1.61* (1.07-2.43)
Female	1.18 (1.00-1.39)	1.34* (1.16-1.54)	2.05* (1.78-2.37)	2.44* (1.74-3.43)
Without partner	0.99 (0.81-1.21)	1.24* (1.05-1.46)	1.05 (0.89-1.24)	1.17 (0.81-1.68)
BMI				
<25 kg/m <sup>2</sup>	1	1	1	1
25-30 kg/m <sup>2</sup>	1.03 (0.86-1.24)	1.18* (1.01-1.39)	1.49* (1.28-1.74)	1.13 (0.79-1.61)
≥30 kg/m <sup>2</sup>	2.01* (1.62-2.50)	1.88* (1.55-2.29)	2.74* (2.25-3.32)	1.53 (0.99-2.35)
Current smoker	1.18 (0.98-1.40)	0.93 (0.80-1.09)	1.15 (0.99-1.34)	1.55* (1.11-2.16)
Problematic alcohol use	0.98 (0.78-1.24)	1.12 (0.92-1.37)	0.87 (0.71-1.07)	0.98 (0.60-1.60)
Lack of leisure-time physical activity	1.46* (1.23-1.72)	1.24* (1.08-1.43)	1.57* (1.37-1.81)	1.87* (1.33-2.63)
High time pressure at work	1.04 (0.87-1.24)	0.98 (0.84-1.15)	1.06 (0.91-1.24)	1.09 (0.76-1.56)
High physical work demands	1.14 (0.94-1.38)	1.09 (0.92-1.28)	1.26* (1.08-1.48)	1.07 (0.73-1.56)
Lack of job control	1.26* (1.06-1.49)	1.15* (1.00-1.33)	1.04 (0.90-1.19)	1.23 (0.88-1.71)
Effort-reward imbalance at work	1.64* (1.33-2.01)	1.25* (1.04-1.50)	1.39* (1.17-1.66)	1.55* (1.03-2.33)

\* P<0.05, OR odds ratio, CI confidence interval

**Table 3.4** Univariate associations between health, individual characteristics, lifestyle, and work characteristics, and transitions into unemployment, retirement, and disability among 4611 initially employed subjects aged 50-63 years old during two years follow-up in the Survey on Health and Ageing in Europe (SHARE)(staying in paid employment as reference category)

	Unemployed (n=127)	Retired (n=482)	Disabled (n=90)	Total exit (n=699)
	OR 95%CI	OR 95%CI	OR 95% CI	OR 95% CI
Less than good perceived health (1/0)	2.49* (1.70-3.66)	1.50* (1.19-1.90)	5.04* (3.28-7.74)	2.08* (1.72-2.51)
Chronic disease (1/0)	1.62* (1.10-2.37)	1.74* (1.42-2.14)	3.00* (1.96-4.59)	2.00* (1.68-2.37)
Mobility problems (1/0)	1.29 (0.88-1.90)	1.37* (1.11-1.68)	3.44* (2.26-5.26)	1.56* (1.31-1.85)
Instrumental limitations in daily activities (1/0)	1.69 (0.76-3.73)	1.25 (0.78-2.02)	3.52* (1.82-6.83)	1.73* (1.19-2.50)
Age				
50-54 yr	1	1	1	1
55-59 yr	1.72* (1.17-2.53)	8.08* (5.91-11.04)	2.36* (1.50-3.72)	3.96* (3.21-4.88)
60-63 yr	2.51* (1.42-4.43)	33.30* (23.36-47.46)	1.31 (0.56-3.07)	8.75* (6.83-11.21)
Educational level				
High	1	1	1	1
Intermediate	1.87* (1.17-3.00)	1.12 (0.89-1.43)	1.56 (0.89-2.72)	1.39* (1.14-1.71)
Low	2.80* (1.69-4.64)	1.65* (1.29-2.12)	2.20* (1.28-3.77)	1.68* (1.37-2.05)
Female	1.16 (0.81-1.66)	0.83 (0.68-1.01)	0.95(0.62-1.45)	0.92 (0.78-1.08)
Without partner	1.36 (0.90-2.05)	0.83 (0.64-1.06)	0.78 (0.45-1.37)	0.92 (0.75-1.13)
BMI				
<25 kg/m <sup>2</sup>	1	1	1	1
25-30 kg/m <sup>2</sup>	1.00 (0.66-1.51)	1.23* (1.00-1.52)	0.97 (0.60-1.56)	1.11 (0.93-1.33)
≥30 kg/m <sup>2</sup>	1.92* (1.21-3.07)	1.40* (1.05-1.84)	1.71 (0.98-2.97)	1.51* (1.20-1.89)
Current smoker	1.21 (0.82-1.80)	0.87 (0.70-1.09)	1.46 (0.93-2.30)	0.97 (0.81-1.17)
Problematic alcohol use	1.04 (0.63-1.72)	1.37* (1.07-1.76)	1.65 (0.95-2.87)	1.57* (1.27-1.94)
Lack of leisure-time physical activity	1.29 (0.89-1.86)	1.24* (1.01-1.51)	0.98 (0.64-1.49)	1.19* (1.01-1.44)
High time pressure at work	0.72 (0.50-1.04)	1.02 (0.83-1.25)	1.23 (0.80-1.90)	1.00 (0.85-1.18)
High physical work demands	1.04 (0.73-1.50)	1.17 (0.96-1.42)	1.57* (1.03-2.40)	1.19* (1.01-1.40)
Lack of job control	1.59* (1.07-2.37)	1.23* (1.00-1.51)	2.68* (1.59-4.54)	1.62* (1.37-1.91)
Effort-reward imbalance at work	1.51* (1.05-2.16)	1.09 (0.89-1.34)	1.62* (1.06-2.48)	1.22* (1.03-1.44)

\* P<0.05, OR odds ratio, CI confidence interval

**Table 3.5** Multivariate associations between 4 different health measures and transitions into unemployment, retirement, and disability among 4611 initially employed subjects aged 50-63 years old in 11 European countries during two years of follow-up in the Survey on Health and Ageing in Europe (SHARE) (staying in paid employment as reference category)

	<b>Unemployed (n=127)</b>	<b>Retired (n=482)</b>	<b>Disabled (n=90)</b>	<b>Total exit (n=699)</b>
	<b>OR 95%CI</b>	<b>OR 95%CI</b>	<b>OR 95% CI</b>	<b>OR 95% CI</b>
Less than good perceived health (1/0) <sup>1</sup>	2.16* (1.47-3.19)	1.38* (1.07-1.79)	4.59* (2.97-7.10)	1.95* (1.59-2.39)
Adjusted for lifestyle factors	2.04* (1.37-3.02)	1.35* (1.04-1.76)	4.52* (2.91-7.02)	1.88* (1.53-2.31)
change	10.3%	7.9%	2.0%	7.4%
Adjusted for work characteristics	2.09* (1.41-3.10)	1.35* (1.04-1.76)	4.36* (2.80-6.77)	1.87* (1.52-2.29)
change	6.0%	7.9%	6.4%	8.4%
Adjusted for lifestyle + work	1.96* (1.32-2.92)	1.32* (1.01-1.72)	4.24* (2.71-6.62)	1.78* (1.45-2.20)
change	14.7%	15.8%	6.1%	17.9%
Chronic disease (1/0) <sup>1</sup>	1.42 (0.96-2.09)	1.38* (1.10-1.73)	2.74* (1.78-4.22)	1.74* (1.45-2.09)
Adjusted for lifestyle factors	1.33 (0.90-1.97)	1.36* (1.08-1.71)	2.71* (1.76-4.19)	1.67* (1.39-2.02)
change	21.4%	5.3%	1.7%	9.5%
Adjusted for work characteristics	1.39 (0.94-2.05)	1.36* (1.08-1.71)	2.66* (1.73-4.11)	1.69* (1.41-2.04)
change	7.1%	5.3%	4.6%	6.8%
Adjusted for lifestyle + work	1.30 (0.88-1.93)	1.28* (1.01-1.62)	2.62* (1.69-4.07)	1.63* (1.35-1.96)
change	28.6%	13.2%	4.0%	14.9%
Mobility problems (1/0) <sup>1</sup>	1.15 (0.78-1.71)	1.20 (0.95-1.51)	3.32* (2.15-5.12)	1.46* (1.21-1.75)
Adjusted for lifestyle factors	1.07 (0.71-1.59)	1.17 (0.93-1.48)	3.35* (2.15-5.22)	1.40* (1.16-1.70)
change	53.3%	15.0%	-1.3%	13.0%
Adjusted for work characteristics	1.12 (0.75-1.66)	1.18 (0.94-1.49)	3.22* (2.08-4.99)	1.43* (1.19-1.72)
change	20.0%	10.0%	4.3%	6.5%
Adjusted for lifestyle + work	1.03 (0.69-1.54)	1.15 (0.91-1.46)	3.22* (2.06-5.03)	1.37* (1.13-1.65)
change	80.0%	25.0%	4.3%	19.6%
Instrumental limitations in daily activities (1/0) <sup>1</sup>	1.43 (0.64-3.19)	1.06 (0.63-1.78)	3.19* (1.62-6.25)	1.55* (1.04-2.30)
Adjusted for lifestyle factors	1.35 (0.60-3.02)	1.03 (0.61-1.74)	3.19* (1.62-6.29)	1.48 (0.99-2.20)
change	18.6%	50.0%	0%	12.7%
Adjusted for work characteristics	1.39 (0.62-3.11)	1.03 (0.61-1.73)	3.00* (1.52-5.93)	1.47 (0.99-2.20)
change	9.3%	50.0%	8.7%	14.6%
Adjusted for lifestyle + work	1.31 (0.58-2.93)	0.99 (0.59-1.69)	2.98* (1.50-5.91)	1.40 (0.93-2.08)
change	18.6%	133.3%	18.7%	28.2%

<sup>1</sup> Adjusted for individual characteristics age, sex and educational level

Table 3.4 shows that self-perceived poor health was a risk factor for transition to unemployment (OR 2.49), retirement (OR 1.50), and work disability (OR 5.04). All four health measures were associated with any exit from work (ORs 1.56-2.08). A low educational level was a risk factor for all three pathways of non-participation (ORs 1.65-2.80). Lifestyle factors seem important for exit through retirement. Except smoking, all lifestyle factors were associated with exit from paid employment through retirement (ORs 1.23-1.40). Among work-related factors lack of job control showed increased risks for all three pathways of exit (ORs 1.23-2.68). High physical work demands were a risk factor only for becoming disabled (OR 1.57). Work related factors seemed most important for exit through work disability in comparison to other pathways.

Table 3.5 shows that the observed associations between different measures of ill health and transitions to non-participation, after adjustment for lifestyle factors and work characteristics. Significant odds ratios between ill health and exit from paid employment decreased by 0% to 10% after adjustment for lifestyle factors, 4% to 9% after adjustment for work factors, and 4% to 19% after adjustment for lifestyle factors and work characteristics simultaneously. Adjustment with lifestyle factors and work related characteristics had a smaller influence on the association between ill health and work disability least compared to the other pathways of exit from paid employment. Lifestyle factors and work related characteristics had a comparable influence on the relation between ill health and exit from paid employment. In the fully adjusted models for each of the four health measures the lifestyle factors obesity and problematic alcohol use remained significant in at least one of the models. Regarding work related characteristics, lack of job control and effort-reward imbalance at work remained significant after full adjustment in at least one of the four models.

The population attributable fractions of a less-than-good self-perceived health for transition into unemployment, retirement, and disabled were 27%, 9%, and 61%, respectively.

## DISCUSSION

During a two year follow-up, 17% of workers employed at baseline left paid employment, primarily due to early retirement. Controlling for individual and work related characteristics, poor self-perceived health was strongly associated with exit from paid employment due to retirement, unemployment, or disability (OR's from 1.32 to 4.24). In order of decreasing importance, chronic diseases, mobility problems and instrumental limitations also influenced exit from paid employment, most notably through disability. Significant associations between ill health and exit from paid employment changed 0 to 19% after adjustment for lifestyle and work characteristics.

Some limitations must be taken into account in this study. First, although the attrition rate between baseline and follow-up was high (68%)[21], attrition was not influenced by sex, but lower in high age groups. Except in Greece and Switzerland there was no relationship between work status and attrition, and those reporting good or better health at baseline had a higher propensity to participate at the follow-up.

Secondly, there are large variations between European countries in the association between ill health and various forms of exit from paid employment.[5] These variations may reflect differences between countries in institutional arrangements (e.g. availability of disability benefit schemes for those with health problems), or other factors (e.g. more or less selectivity of unemployment dependent on over-all levels of unemployment). All analyses were therefore adjusted for country. Due to small numbers, country-specific or region-specific analyses were not feasible.

Third, all variables were based on self-reported data, which could have caused reporting bias. The problem with using self-reported health in an empirical analysis of labour force participation is that it may be an endogenous explanatory variable.[13, 22-23] According to the justification hypothesis individuals justify their non-participation by claiming that they are in ill health. Subjects with intentions at baseline to quit paid employment in the near future may also have been more prone to report high work demands or a less beneficial effort-reward balance in order to justify their future exit from paid employment.[17]

Fourth, the current study used a follow-up period of two years and, therefore, had limited discriminatory power and does not give insight in long-term effects of poor health on exit from paid employment or the relevant time windows for these effects. A European study showed that poor health had the strongest effects on leaving the workforce in the year before the transition.[8] Thus, it is expected that the reported influence of ill health on exit from paid employment is a fair reflection of the effects of ill health on work participation.

Several studies have analyzed the effects of health on exit from paid employment of older workers.[3, 5-7, 9, 24-27] The results of this study support the selection hypothesis, whereby people with poor health are more likely to quit paid employment.[28] The influence of type of health measure differs by route of exit, but an overall effect on total exit was consistently present for all measures of ill health.

The relation between poor health and exit from paid employment may be explained by a mismatch between an individual's capacities and the requirements of the job.[2] Functional limitations might therefore be more important than self-perceived poor health for future loss of paid employment. However, the analyses showed that a poor self-perceived health was a stronger predictor for pathways of exit than functional limitations, expressed by either mobility problems or instrumental limitations in daily activities. An explanation could be that self-perceived health includes mental health

as well, whereas functional limitations concern primarily physical health. The high prevalence of depression in the cohort may have contributed to the association between self-perceived health and future exit from paid employment.

The analyses also showed that having ever being diagnosed with a chronic disease played a less profound role in exit from paid employment. This may be explained by the fact that people diagnosed with these chronic conditions who remained in paid employment are a selection of the fittest survivors [29], while those who already left paid employment due to these diseases have not been included in our sample as they had already left paid employment before the baseline investigation. Analyses on the role of onset of disease during the follow-up period was not feasible as only 12 subjects reported that the onset of their chronic disease had been diagnosed during the follow-up period.

The direct influence of ill health on exit from paid employment had odds ratios varying between 1.37 and 5.04. The corresponding population attributable fractions of a less-than-good self-perceived health for transition into unemployment, retirement, and disabled were 27%, 9%, and 61%, respectively. Under the assumption that the observed associations represent a causal process, these associations and population attributable fractions indicate that a good health is an important factor in maintaining paid employment. Based on this finding interventions aimed at prevention of exit from paid employment should prevent or minimize ill health. Given the strong associations at baseline between obesity and lack of leisure time physical activity with several measures of ill health, health promotion interventions should be considered that increase physical activity and support a healthy diet.[30-31] The consistent associations at baseline between lack of job control, high physical work demands, and effort-reward imbalance with several measures of ill health, outline the importance of improvement of working conditions and work organization as well.

We observed that adjustment with lifestyle factors and work related characteristics showed reasonable changes in health related exit from paid employment. The change was only important for statistically significant associations because a small difference in odds ratio could otherwise result in a high proportion of change. The influence of lifestyle factors and work characteristics on the impact of ill health on labour force exit points at the importance of providing workers with health problems with possibilities that will enable them to continue working, for example by empowering workers with chronic diseases.[32]

In the fully adjusted model obesity, problematic alcohol use, low job control, and effort-reward imbalance remained statistically significant for at least one of the pathways of exit in at least one of the models.

Different studies support the association between unhealthy lifestyles, such as lack of physical activity, obesity, and problematic alcohol use, and exit from paid employ-

ment.[5, 27, 33-35] In the fully adjusted multinomial models problematic alcohol use was consistently associated with entering work disability with ORs varying from 1.84-1.88. It has been suggested that this may be explained by problems with working times, work output, concentration, occupational safety, and cooperation, irrespective of health status.[8] In the multivariate model obesity was associated with becoming unemployed, (OR 1.67). This is in agreement with a French study that reported obesity as a risk factor for unemployment after controlling for self-reported health.[34]

Smoking was not associated with early exit. Earlier studies have shown contradictory results, with significant associations for smoking [8, 36-39] as well as non-significant associations with different forms of exit from paid employment.[34, 40-41]

In the fully adjusted models lack of job control remained a significant predictor for exit through retirement and disability, whereas effort-reward imbalance predicted unemployment. Several studies have corroborated the observed direct influence of strenuous working conditions on exit from paid employment. [7, 27, 36, 42-43] In a cross-sectional analysis of the SHARE survey at baseline, a high imbalance between efforts and rewards was also associated with intended early retirement after controlling for poor self-perceived health [17]. Hence, preventive measures towards problematic alcohol use, obesity, job control, and effort-reward imbalance will contribute to diminish the occurrence of health related early exit from paid employment.

This study only focused on exit from paid employment, but poor health could have an additional impact in terms of change of jobs and stalled careers. The Health and Retirement Survey [25] showed that workers after the onset of health problems often changed jobs within several years. This might also be true for the onset of poor health in earlier phases of the career (younger workers). Poor health may also have adverse effects on performance at work, as observed in the influence of poor health on sickness absence [44] and productivity loss at work.[45-46] Duration of employment contract could be of influence on sustaining paid employment. However, only 7% of the subjects with paid employment had a temporary employment contract, and thus this parameter could not be evaluated in this study.

The health status of older European workers has a major influence on the likelihood of sustaining paid employment. Self-perceived poor health and, to a lesser extent, having a chronic disease, perceiving mobility problems and limitations seem predictive for future work participation. There is consistent evidence that social inequalities in health depend on work related factors as well as lifestyle behaviours.[47-48] The results of this study suggest that labour market participation of older workers with ill health may be sustained by interventions that promote a healthier life and healthier working conditions. As exit from paid employment is often irreversible at older age, prevention of work loss by improving worker's health or improving ill workers' work circumstances and lifestyles should be a key priority. Important entry-points

for policy could be lifestyle interventions, improvements of job control and effort-reward balance, and social policies to encourage employment among older persons with health problems.

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# 4

## **The effects of ill health on entering and maintaining paid employment: evidence in European countries**

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## ABSTRACT

**Objectives:** To examine the effects of ill health on selection into paid employment in European countries.

**Methods:** Five annual waves (1994-8) of the European Community Household Panel were used to select two populations: (1) 4446 subjects unemployed for at least 2 years, of which 1590 (36%) subjects found employment in the next year, and (2) 57436 subjects employed for at least 2 years, of which 6191 (11%) subjects left the workforce in the next year because of unemployment, (early) retirement, or having to take care of household. The influence of a perceived poor health and a chronic health problem on employment transitions was studied using logistic regression analysis.

**Results:** An interaction between health and sex was observed, with women in poor health (odds ratio (OR) 0.4), men in a poor health (OR 0.6), and women (OR 0.6) having less chance to enter paid employment than men in good health. Subjects with a poor health and low/intermediate education had the highest risk of unemployment or (early) retirement. Taking care of the household was only influenced by health among unmarried women. In most European countries, a poor health or a chronic health problem predicted staying or becoming unemployed and the effects of health were stronger with a lower national unemployment level.

**Conclusion:** In most European countries, socio-economic inequalities in ill health were an important determinant for entering and maintaining paid employment. In public health measures for health equity, it is of paramount importance to include people with poor health in the labour market.

## INTRODUCTION

The presence of socioeconomic inequalities in health has been widely acknowledged. [1] Lower education, unskilled labour and low income are associated with higher mortality and morbidity.[2] Labour force participation is an important determinant of health inequalities, as demonstrated by a higher prevalence of illness and disability [3,4] and a higher mortality among unemployed people.[5] The association between health and employment is bi-directional: unemployment may cause poor health (causation hypothesis) and poor health may increase the probability of becoming unemployed (selection hypothesis) [6,7]

The causation mechanism is illustrated among British households, where unemployment had a strong effect on the incidence of any limiting illness and employment was related to recovery from these illnesses.[6] A review of longitudinal studies concluded that loss of employment affected mental health, but also that gaining employment improved mental health.[8]

There is also evidence for the selection hypothesis. Among long-term unemployed Norwegians, mental morbidity was strongly associated with a reduction in obtaining a paid job.[9] In a British study, healthier people were found more likely to gain employment than people with minor psychiatric morbidity.[7] Ill health may also increase other forms of non-employment, such as early retirement and having to staying home to take care of the family.[7, 10] In a Finnish cohort of men, self-assessed poor health was a strong predictor of both disability as well as non-illness based early retirement. [11]

The associations between health and employment will not be similar across all socio-economic groups, as age, education, sex, marital status or household income may influence the social context of health and employment status.[12][13] The consequences of ill health for the likelihood of becoming or staying unemployment may depend on social and labour market policies, which vary across European countries. For example, striking differences in access to benefits, such as early retirement or disability pension, for disabled people have been described within the European Union. In the Netherlands, < 10% of disabled people have labour as their main source of income whereas in Sweden this proportion amounts to over 50%.[14]

Against this background, the aim of this study was to investigate the effects of ill health on the selection process into paid employment and whether these effects interacted with socioeconomic groups. The secondary aim of the study was to investigate whether observed associations between ill health and employment transitions differed among European countries.

## METHODS

### Study population

The data were derived from the first five waves (1994-8) of the European Community Household (ECHP).[15] The ECHP is a social survey among member states of the European Union with a longitudinal design to describe the social dynamics in Europe. Data were collected by National Institutes for Statistics or research centers, while data checks, weightings and imputations were done centrally by the Statistical Office of the European Communities (Eurostat). All surveys were based on a non-stratified random sampling design among all national private households. All members of the household were individually interviewed. The data collection was carried out in most countries by paper-and-pencil interviewing, but in four countries (United Kingdom, The Netherlands, Portugal, and Greece) by computer-assisted personal interviewing. The overall household response rate in the first wave was 72%, but varied considerably among countries. The response rates in later waves of the ECHP study were higher. A detailed description of sampling procedures and response rates has been published elsewhere.[16, 17]

For the purpose of this study, subjects aged between 16-65 years were selected, with available information on employment status and health status during at least three consecutive annual measurements, whereby the employment status remained unchanged in the first and second measurement and a possible employment transition had occurred in the third measurement. Although employment status was ascertained annually, we considered this status as representative for the whole year preceding the administration of the questionnaire. This procedure resulted in a cohort with 3 years of follow-up, with two consecutive years before a possible employment transition. For a small part of the cohort, information was also available in the third and fourth annual measurement before the year of employment transition. Thus, for every subject, an employment transition was possible in a given year and labour status was regarded as constant in the 2-4 years before possible employment transition.

Self-defined employment status was classified into four mutually exclusive categories: employed (paid employment, paid apprenticeship or self-employment), unemployment, retired or taking care of household.[15] Employment was defined as working in a job for at least 15 h/week. Subjects working <15 h/week were automatically classified into the categories unemployed, retired, taking care of household, in military service, following education or economically inactive. Unemployed subjects were defined as those people who worked <15 h/week and who considered themselves as being unemployed. Subjects who classified themselves into the last three categories were not selected for analysis in this study, hence excluding economically



inactive people who are without work and who do not wish to consider themselves as unemployed. Subjects with a disability pension as another form of non-employment were also excluded from the analysis, as poor health is an essential requirement to qualify for a disability pension. However, disabled persons with a paid job for >15 h/week were included in the category “employed”.

Two different populations were defined to study employment transitions. The first study population included 4446 people who were unemployed for at least two consecutive years, of which 1590 (36%) people entered the workforce during the last year of follow-up. The second study population consisted of 57436 workers who were employed for at least two consecutive years, of which 6191 (11%) people left the workforce in the last year of follow-up due to unemployment (n=3000), retirement (n=2017) or having to take care of the household (n=1174).

## Questionnaire

The questionnaire comprised questions on individual and household characteristics, perceived general health, chronic health problem, and employment status. Individual characteristics included age, sex, education and personal income. Household characteristics included marital status, the presence of children aged  $\leq 12$  years and household income. Subjects were divided into three groups according to their level of educational attainment on the basis of the International Standard Classification of Education (ISCED).[18] Information on marital status was used to compare subjects married or living with others. Household and personal income were categorized into three percentile groups (<25th centile, 25-75th centile and >75th centile), relative to the income distribution of the study sample in each country. If the personal income of a subject was  $\geq 75\%$  of the household income, the subject was defined as breadwinner within the household.

Two measures of self-reported health were used. First, subjects were asked to rate their own general health on a five-point scale, ranging from “very good”, “good”, “fair” and “bad” to “very bad”. Those reporting less than “good health” were defined as having a poor health.[19] Second, subjects were asked whether they had any chronic physical or mental health problem, illness or disability (yes/no). An affirmative answer was classified as chronic health problem [15]

## Statistical methods

Logistic regression analysis was performed to study the impact of poor health and a chronic health problem on employment status, adjusted for country and personal and household characteristics. The first step in the analysis was to establish the associations

between poor health and employment status, including country as a categorical variable (fixed factor) to adjust for the effect of country on the association between poor health and employment status. In the second step, other independent socio-demographic variables were included in the model by a step-forward procedure. The variable with the strongest association with employment status was put in the model first, followed by the next strongest, and so on. Variables with a significant reduction in the overall scaled deviance of the model were retained in the multivariate model. In the third step, interactions between poor health and significant socio-demographic variables were investigated for their influence on the overall fit of the model. The interaction with the strongest effect on the scaled deviance of the model was included in the final multivariate model. Thus, interaction terms without health were not considered, thereby excluding possible interactions among socio-demographic variables. For all analyses, four different time windows were applied, investigating the effects of the independent variables measured 1, 2, 3, and 4 years before the employment transition. All statistical models were based on the (varying) number of people available for the three different measures of employment status, without weighing the regression coefficient according to attrition rate in the country sample or population size in each country.

For the analysis on transition from employment to (early) retirement, only subjects in the age group 55-65 years were used, as occurrence of retirement among those aged  $\leq 54$  was very low. Owing to this selection, age was not included in this analysis. Likewise, the analysis on transition from employment to household was restricted to women, as only very few men classified themselves as taking care of the household without having any paid job.

The variation among countries in the association between poor health and employment status was investigated by introduction of the interaction term of poor health and country in each multivariate model. This interaction term was used to estimate the country-specific associations for poor health and employment status (expressed by odds ratios (ORs)), adjusted for relevant socio-demographic covariates. All analyses were repeated with the presence of a chronic health problem as outcome measure. The analyses were carried out with the statistical package SAS V.8.2.

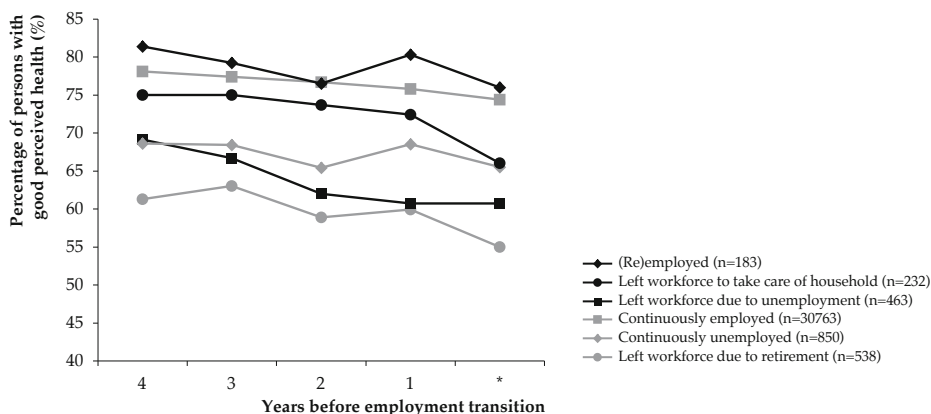
## RESULTS

The background characteristics of both populations are presented in Table 4.1. Both health measures were strongly associated with almost 50% of all persons reporting a perceived poor health, also indicating the presence of a chronic physical or mental health problem, illness or disability. Ill health, sex, education, having young children in household and being a breadwinner were associated with employment transition.

**Table 4.1** Background characteristics of subjects from the European Household Panel Survey in the year of an employment transition after at least two consecutive years of unemployment or employment

Characteristic	Subjects with at least 2 years of unemployment who remained unemployed (n=2856) or entered employment (n=1590) in the 3rd year		Subjects with at least 2 years of employment who remained employed (n=51245) or left the workforce (n=6191) in the 3rd year	
	Unemployed n (%)	Became employed n (%)	Employed n (%)	Left workforce n (%)
Age (years)				
16 – 24	758 (27)	586 (38)*	5610 (11)	736 (13)
25 – 44	1241 (45)	785 (49)	29344 (60)	2200 (38)*
45 – 54	463 (17)	170 (11)	10764 (22)	1102 (19)
55 – 65	291 (11)	38 (2)*	3240 (7)	1805 (31)*
Sex (men)	1315 (46)	886 (56)*	31642 (62)	3216 (52)*
Married (yes)	1333 (47)	700 (44)	36347 (71)	4399 (71)
Educational level				
High	263 (10)	192 (13)	13297 (27)	896 (15)*
Intermediate	956 (25)	595 (39)	18838 (38)	2029 (34)
Low	1507 (55)	732 (48)*	17594 (35)	2982 (51)*
Children <12 years	800 (28)	498 (31)*	17797 (35)	1674 (27)*
Breadwinner	481 (17)	251 (16)	16341 (32)	1585 (26)*
Perceived poor health	968 (34)	327 (21)*	12437 (24)	2311 (37)*
Chronic health problem	662 (23)	200 (13)*	8100 (16)	1544 (25)*

\* Wald  $\chi^2$  – test, P<0.05



**Figure 4.1** Proportion of subjects with a perceived good health among respondents who completed all five waves of the European Household Panel Survey and an employment transition in the last year of the survey

Figure 4.1 shows that in all groups the proportion of people in good health decreased in the period 1994-8. The proportion of people in good health was consistently higher among those who were employed or became employed than among people who were not employed or left the workforce.

Table 4.2 shows that an interaction was observed between health status and sex. Women with poor health, men with poor health and women with good health were significantly more likely to remain unemployed in the next year than men with good health. This interaction was present up to 4 years before entering paid employment. A positive impact on (re)employment was observed for people being married, being of younger age, having higher education and having higher personal income. Being a breadwinner (OR 0.9, 95% CI 0.8-1.2) and having children <12 years in the household (OR 1.0, 95% CI 0.8-1.2) were not associated with entering paid employment. Chronic health problems showed very similar results for all time windows (results not shown).

Table 4.3 shows that poor health was more important among those with higher education than among those with lower education becoming unemployed. The effect of poor health within the strata of intermediate and higher education became less strong

**Table 4.2** Multivariate models with different time windows of significant determinants of (re)employment among subjects from the European Household Panel Survey with at least 2 consecutive previous years of unemployment before entering paid employment

Determinant	Years before entering paid employment			
	1 year OR (95% CI)	2 years OR (95% CI)	3 years OR (95% CI)	4 years OR (95% CI)
N stayed unemployed	2634	2646	1444	792
N entered employment	1481	1483	609	174
Poor health - Women†	0.4 (0.3-0.5)*	0.4 (0.3-0.5)*	0.6 (0.4-0.8)*	0.5 (0.3-0.9)*
Good health -Women	0.6 (0.5-0.7)*	0.6 (0.5-0.7)*	0.5 (0.4-0.7)*	0.7 (0.5-1.0)*
Poor health - Men	0.6 (0.4-0.7)*	0.6 (0.5-0.7)*	0.6 (0.4-0.8)*	0.6 (0.4-1.1)
Good health - Men	1	1	1	1
Age (years)				
16-24	8.1 (5.4-12.2)*	9.0 (6.0-13.5)*	11.0 (5.2-23.4)*	4.7 (1.4-14.9)*
25-44	5.7 (3.9-8.3)*	6.0 (4.2-8.8)*	8.3 (4.1-17.0)*	3.6 (1.2-10.8)*
45-54	3.3 (2.2-5.0)*	3.4 (2.3-5.0)*	4.7 (2.2-9.9)*	1.7 (0.5-5.7)
55-64	1	1	1	1
Married	1.4 (1.2-1.7)*	1.4 (1.2-1.6)*	1.4 (1.1-1.8)*	1.6 (1.0-2.6)*
Educational level				
High	1.7 (1.3-2.1)*	1.6 (1.3-2.0)*	2.1 (1.5-2.9)*	2.6 (1.5-4.7)*
Intermediate	1.6 (1.3-1.8)*	1.5 (1.3-1.8)*	1.6 (1.3-2.0)*	1.9 (1.2-2.8)*
Low	1	1	1	1
Personal income				
> 75th centile	1.6 (1.3-1.9)*	1.9 (1.6-2.3)*	1.8 (1.4-2.5)*	1.4 (0.9-2.3)
25-75th centile	1.5 (1.2-1.7)*	1.4 (1.2-1.6)*	1.4 (1.1-1.8)*	1.0 (0.6-1.6)
<25th centile	1	1	1	1

\* Wald  $\chi^2$  - test,  $P < 0.05$ .

† significant interaction.

**Table 4.3** Multivariate models with different time windows of significant determinants of becoming unemployed among subjects from the European Household Panel Survey with at least 2 consecutive previous years of employment before becoming unemployed

Determinant	Years before becoming unemployed			
	1 year OR (95% CI)	2 years OR (95% CI)	3 years OR (95% CI)	4 years OR (95% CI)
N (stayed employed)	47378	36610	30706	28780
N (became unemployed)	2700	1629	515	427
Poor health - low education <sup>†</sup>	2.2 (1.8-2.6)*	2.5 (2.0-3.1)*	2.3 (1.6-3.4)*	2.5 (1.6-3.9)*
Good health - low education	1.9 (1.7-2.2)*	1.9 (1.6-2.3)*	2.2 (1.6-3.1)*	2.2 (1.5-3.1)*
Poor health - intermediate education	2.4 (2.0-2.9)*	2.1 (1.7-2.6)*	2.5 (1.7-3.7)*	2.3 (1.5-3.5)*
Good health - intermediate education	1.4 (1.2-1.6)*	1.5 (1.2-1.8)*	1.6 (1.2-2.3)*	1.8 (1.3-2.6)*
Poor health - high education	2.1 (1.6-2.6)*	1.6 (1.2-2.2)*	1.4 (0.8-2.4)*	1.2 (0.7-2.3)
Good health - high education	1	1	1	1
Age (years)				
16-24	1.0 (0.9-1.3)	1.0 (0.8-1.3)	0.9 (0.6-1.4)	0.9 (0.6-1.4)
25-44	0.8 (0.7-0.9)*	0.8 (0.6-1.0)*	0.8 (0.5-1.1)	0.7 (0.5-1.0)
45-54	0.8 (0.7-0.9)*	0.8 (0.6-1.0)	0.9 (0.6-1.3)	0.8 (0.5-1.2)
55-64	1	1	1	1
Married	0.7 (0.6-0.7)*	0.7 (0.6-0.8)*	0.7 (0.6-0.9)*	0.8 (0.6-0.9)*
Children <12 years	1.2 (1.1-1.3)*	1.1 (1.0-1.3)	1.1 (0.9-1.4)	n/a
Personal income				
>75th centile	0.2 (0.2-0.3)*	0.2 (0.2-0.3)*	0.3 (0.3-0.5)*	0.4 (0.3-0.6)*
25-75th centile	0.5 (0.4-0.5)*	0.4 (0.4-0.5)*	0.5 (0.4-0.6)*	0.5 (0.4-0.7)*
<25th centile	1	1	1	1

n/a = not available in data collection.

\* Wald  $\chi^2$  - test,  $P < 0.05$ .

<sup>†</sup> significant interaction.

in more distant years. Job loss was also influenced by older age, not being married, having children <12 years (as per the previous year) and having lower personal income. Being breadwinner (OR 1.0, 95% CI 0.9-1.1) or men (OR 1.1, 95% CI 1.0-1.2) did not influence unemployment. The impact of chronic health problems was remarkably similar to a perceived poor health (results not shown).

Among subjects aged  $\geq 55$  years, those with a poor health had a higher chance of retiring the next year than subjects with a good health (table 4.4). Among highly educated subjects, this association was not observed for the health status 2, 3, and 4 years before the year of retirement. Being married seemed to reduce the likelihood of retirement. Breadwinner, sex, and personal income all had odds ratios close to unity. The influence of a chronic health problem on (early) retirement closely mirrored the results of a perceived poor health.

Table 4.5 demonstrates that taking care of the household was influenced by health among unmarried women (OR = 1.6) but not among married women. This association was only observed in earlier years. Leaving the workforce to take care of the household was consistently associated with older age, having young children, low personal income, and low educational level.

**Table 4.4** Multivariate models with different time windows of significant determinants of retirement among workers aged 55-65 years in the European Household Panel Survey with at least 2 consecutive previous years of employment before retirement

Determinant	Years before retirement			
	1 year OR (95% CI)	2 years OR (95% CI)	3 years OR (95% CI)	4 years OR (95% CI)
N (stayed employed)	3140	3167	2097	1778
N (became retired)	1374	1384	806	345
Poor health - low education†	1.7 (1.4-2.2)*	1.7 (1.3-2.1)*	1.4 (1.0-1.9)*	1.6 (1.0-2.4)*
Good health - low education	1.3 (1.0-1.6)*	1.2 (1.0-1.5)	1.2 (0.9-1.5)	1.2 (0.8-1.8)
Poor health - intermediate education	2.0 (1.6-2.7)*	1.8 (1.3-2.4)*	1.7 (1.2-2.6)*	1.7 (1.0-2.9)*
Good health - intermediate education	1.4 (1.1-1.6)*	1.3 (1.1-1.7)*	1.2 (0.8-1.7)	1.1 (0.7-1.7)*
Poor health - high education	1.5 (1.0-2.2)*	1.1 (0.8-1.6)	0.8 (0.5-1.3)	1.1 (0.6-2.1)
Good health - high education	1	1	1	1
Married	0.8 (0.7-1.0)*	0.8 (0.7-1.0)*	0.8 (0.7-1.0)	0.9 (0.6-1.2)

\* Wald  $\chi^2$  - test,  $P < 0.05$ .

† significant interaction.

In table 4.6, the country-specific associations are presented for 11 countries (Luxembourg not included as associations were not estimable there because of very small numbers). In 9 of 11 European countries, a perceived poor health was a risk factor for staying unemployed, varying from OR=0.2 in Denmark to OR=0.7 in Germany and France, although this association reached the conventional level of statistical significance in only four countries. In 7 of 11 countries a perceived poor health increased the risk of becoming unemployed, varying from OR=1.2 in France to OR=2.7 in the Netherlands. Among older workers, a perceived poor health raised the likelihood of retirement in nine countries, with small effects observed in France and the UK (OR=1.1) and significant large effects in Belgium (OR=2.6) and Germany (OR=2.6). For poor health and a chronic health problem, in general, comparable associations were found, with the exception of two countries. In Italy, a chronic health problem predicted remaining unemployed (OR=0.4), but poor health had no discernable impact (OR=1.0). In the Netherlands, a chronic health problem seemed to increase the likelihood of retirement among older workers (OR=1.7), whereas a poor health decreased retirement (OR=0.6), although both associations were not statistically significant. Figure 4.2 illustrates that a lower unemployment rate at national level in 1998 was associated with larger effects of poor health on not entering employment (regression coefficient 0.06,  $R^2=0.46$ ,  $p=0.02$ ) and larger effects of poor health on becoming unemployed (regression coefficient -0.10,  $R^2=0.27$ ,  $p=0.10$ ). This trend over countries was not observed for the effects of poor health on retirement or taking care of household.

**Table 4.5** Multivariate models with different time windows of significant determinants of leaving employment for household care among women in the European Household Panel Survey with at least 2 consecutive previous years of employment before leaving the workforce to take care of household

	Years before leaving the workforce to take care of household			
	1 year OR (95% CI)	2 years OR (95% CI)	3 years OR (95% CI)	4 years OR (95% CI)
N (stayed employed)	18100	13818	11351	10419
N (household)	1000	608	229	193
Poor health - married	2.6 (2.0-3.3)*	2.1 (1.5-2.8)*	1.7 (1.1-2.7)*	1.3 (0.8-2.2)
Good health - married	2.4 (2.0-3.0)*	1.9 (1.4-2.4)*	1.7 (1.1-2.6)*	1.7 (1.1-2.5)*
Poor health - not married	1.6 (1.1-2.3)*	1.3 (0.9-2.0)	0.7 (0.3-1.4)	0.9 (0.4-1.7)
Good Health - not married	1	1	1	1
Age				
16-24	0.5 (0.4-0.7)*	0.4 (0.3-0.7)*	0.6 (0.3-1.2)	0.6 (0.3-1.2)
25-44	0.4 (0.3-0.5)*	0.4 (0.3-0.5)*	0.4 (0.3-0.7)*	0.4 (0.2-0.6)*
45-54	0.4 (0.3-0.5)*	0.4 (0.3-0.6)*	0.5 (0.3-0.9)*	0.4 (0.2-0.7)*
Educational level				
High	0.6 (0.5-0.8)*	0.7 (0.5-0.9)*	0.8 (0.5-1.2)	0.7 (0.5-1.2)
Intermediate	0.8 (0.7-1.0)*	0.9 (0.7-1.1)	0.9 (0.7-1.3)	0.9 (0.6-1.3)
Low	1	1	1	1
Children < 12 years	1.9 (1.6-2.2)*	1.6 (1.3-1.9)*	1.1 (0.8-1.5)	n/a
Personal income				
>75th centile	0.3 (0.2-0.4)*	0.2 (0.2-0.4)*	0.4 (0.2-0.6)*	0.3 (0.2-0.6)*
25-75th centile	0.4 (0.3-0.4)*	0.4 (0.3-0.5)*	0.4 (0.3-0.6)*	0.6 (0.4-0.8)*
<25th centile	1	1	1	1

n/a = not available in data collection.

\* Wald  $\chi^2$  - test,  $P < 0.05$ .

† significant interaction

## DISCUSSION

This study shows that the effects of health on transitions between paid employment and various forms of non-employment were influenced by socio-demographic variables. A poor health was a risk factor for remaining unemployed among men, but had less effect among women. A poor health was also a risk factor for becoming unemployed or retiring, especially among highly educated workers. Finally, among women the transition from employment into taking care of a household was influenced by a poor health only among women not married. In most European countries, poor health and a chronic health problem were risk factors for not entering the workforce or becoming unemployed, but large differences among countries were observed that could partly be explained by the unemployment rate at national level.

These conclusions are based on the European Household Panel Survey. An obvious disadvantage of the current analysis is the restriction to two measures of self-reported health. Both measures of health were strongly correlated, as one would expect. Unfor-

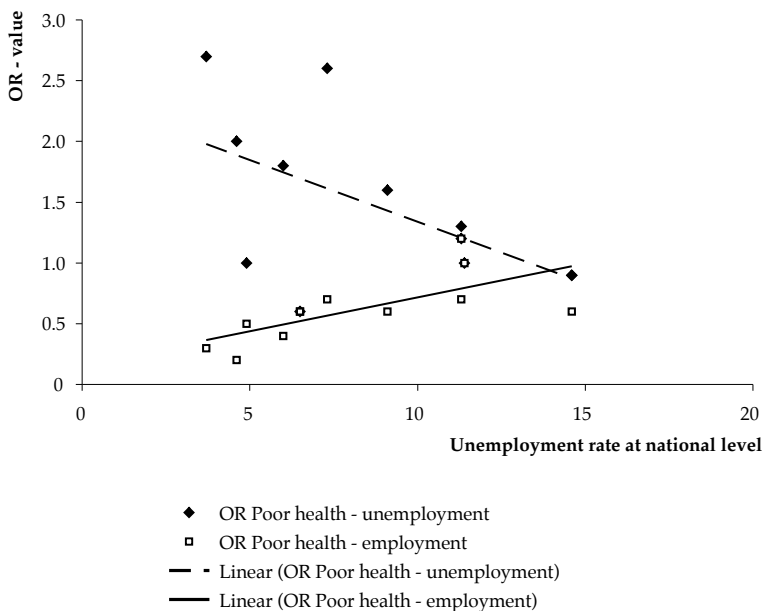
**Table 4.6** Influence of perceived poor health and chronic health problems in the previous year on employment transitions in the next year among subjects from the European Household Panel Survey in 11 European countries

Country	From unemployed to employed		From employed to unemployed		From employed to retired (> 55 year)	
	n	OR	n	OR	n	OR
Germany	483		9530		796	
Perceived poor health		0.7 (0.5-1.1)		2.6 (2.1-3.8)*		2.6 (1.8-3.8)*
Chronic health problem		0.9 (0.5-1.3)		2.2 (1.8-2.7)*		2.4 (1.7-3.4)*
Denmark	130		2564		223	
Perceived poor health		0.2 (0.1-0.7)*		2.0 (1.3-3.2)*		1.6 (0.8-3.0)
Chronic health problem		0.5 (0.2-1.2)		1.2 (0.8-1.8)		1.1 (0.7-2.0)
Netherlands	344		3804		130	
Perceived poor health		0.3 (0.2-0.6)*		2.7 (1.8-4.0)*		0.6 (0.1-5.8)
Chronic health problem		0.4 (0.3-0.8)*		2.8 (1.98-4.3)*		1.7 (0.3-10.8)
Belgium	280		2699		134	
Perceived poor health		0.6 (0.2-1.3)		1.6 (1.0-2.6)		2.6 (1.1-6.3)*
Chronic health problem		0.3 (0.1-1.4)		1.3 (0.6-2.5)		1.5 (0.6-4.4)
France	485		5609		370	
Perceived poor health		0.7 (0.4-1.1)		1.2 (1.0-1.6)		1.1 (0.7-1.7)
Chronic health problem		0.8 (0.5-1.4)		1.2 (0.9-1.7)		1.5 (0.9-2.6)
United Kingdom	229		7109		605	
Perceived poor health		0.4 (0.2-0.8)*		1.8 (1.3-2.6)*		1.1 (0.7-1.8)
Chronic health problem		0.4 (0.2-0.8)*		1.2 (0.9-1.8)		1.5 (1.0-2.3)
Ireland	260		2860		299	
Perceived poor health		0.6 (0.3-1.3)		0.6 (0.2-1.5)		1.4 (0.7-2.7)
Chronic health problem		0.7 (0.3-1.6)		0.8 (0.4-1.7)		1.4 (0.7-2.7)
Italy	891		6238		554	
Perceived poor health		1.0 (0.7-1.5)		1.0 (0.7-1.3)		0.8 (0.6-1.1)
Chronic health problem		0.4 (0.2-0.9)*		0.9 (0.5-1.6)		0.9 (0.5-1.5)
Greece	385		3740		489	
Perceived poor health		1.2 (0.5-2.5)		1.3 (0.8-2.0)		1.3 (0.9-2.0)
Chronic health problem		0.7 (0.2-2.1)		1.0 (0.6-1.8)		0.9 (0.6-1.6)
Spain	784		4897		410	
Perceived poor health		0.6 (0.4-0.9)*		0.9 (0.7-1.2)		1.5 (1.0-2.4)*
Chronic health problem		0.4 (0.3-0.7)*		1.1 (0.8-1.4)		1.3 (0.8-2.0)
Portugal	191		4851		669	
Perceived poor health		0.5 (0.3-1.0)*		1.0 (0.7-1.2)		1.5 (1.0-2.4)
Chronic health problem		0.9 (0.4-2.1)		1.5 (1.1-2.0)*		1.8 (1.2-2.7)*

\* Wald  $\chi^2$  - test,  $P < 0.05$ , adjusted for age, sex, marital status, education, and personal income.

tunately, no information was available on self-reported or diagnosed specific diseases and, hence, it was not possible to evaluate which particular diseases largely explained the role of health in entering or leaving the workforce. The ordinal measurement and subsequent dichotomising of self-perceived health may hamper comparability across countries and, indeed in our study populations, the prevalence of poor health varied from about 8% in Greece and Ireland to over 40% in Portugal and Germany. However, the magnitude of the prevalence was not associated with the observed ORs for poor health. In addition, when using a more stringent cut-off point for a poor health (only





**Figure 4.2** The magnitude of the association between a perceived poor health and becoming unemployed or entering employment (OR) against the national unemployment rate in 1998 among 11 countries in the European Household Panel Survey

including subjects with bad or very bad health), results remained largely similar, although the Ors for the effects of poor health and intermediate or high education on becoming unemployed or retiring were somewhat higher than those presented in tables 4.3 and 4.4. This suggests that the distributional differences among countries have not invalidated our findings.

A second drawback was the large variation in household responses, which in some countries were very low, most notably in Germany (48%) and Ireland (56%). In addition, among subjects lost to follow-up between annual questionnaires (attrition rate) those with younger age, lower education, unmarried, and male gender were over-represented.[16] The low household response in some countries could be influenced by health, but whether differential bias is present remains unknown. As the national attrition rate was not associated with the prevalence of perceived poor health at baseline, we do not expect a substantial bias in the non-response during the follow-up.

A third disadvantage was the use of self-reported labour status, which may differ from official definitions. For example, a person may consider himself as unemployed only when he is actively looking for work, whereas others on unemployment benefit may have categorized themselves as economically inactive. Another example is the inability to distinguish illness-based unemployment or retirement from non-illness based unemployment or retirement. Subjects becoming or remaining unemployed

may include a substantial proportion of subjects with (work related) disability. In the baseline survey, approximately 2% of the respondents classified as unemployed stated that the main reason for not seeking work was their own illness, injury or incapacitation. Hence, this will have only a small effect on the observed influence of poor health on the likelihood of entering paid employment.

The results of this study support the existence of a health selection in the workforce as healthier people are more likely to become or remain employed than less healthy people. Several studies have reported a similar impact of health on entering paid employment or leaving the workforce. Iversen and Sabroe [20] showed that psychological health remained stable for those employed or unemployed during a 2 year follow-up, whereas for those losing or gaining employment, psychological health decreased or increased, respectively. The likelihood of finding paid work was negatively influenced by mental health problems in British workers [7] and by health-related difficulties in Finland.[21] A Swedish longitudinal study showed that subjects with limiting longstanding illness had an increased risk of becoming unemployed [10] and among Finnish middle-aged men, a poor health predicted non-illness based early retirement. [11] The influence of age, education, and marital status on employment status reflects well-known labour market conditions—for example, in almost every European country, unemployment is highest among younger people and among those with a low level of educational attainment.[22] The specific contribution of the current study is that it shows that poor health had a long-term effect on entering paid employment, but a much more transient effect on leaving the workforce. Poor health was a risk factor for not entering paid employment already four years before the potential transition into the workforce. It is of interest to note that in the current study the effect of poor health on entering paid employment was consistently present up to four years before the actual transition took place. This suggests that the health status among unemployed subjects with poor health remains stable over time and, hence, has a long-term effect on the probability of entering paid employment. In contrast, the effects of poor health on unemployment, retirement or taking care of household were less pronounced in more distant years, suggesting a more transient pattern, with a change in health being the risk factor rather than poor health.

Few studies have reported on interactions between health status and socioeconomic position. McDonough and Amick[13] demonstrated that, in the USA, the effect of perceived ill health on labour market exit depended on sex, race, and education. Poor health was a more important factor in leaving the workforce than among women, and the effect of poor health on labour force exit increased with education. Both findings were corroborated in our study (table 4.2 and 4.3, respectively). The effect of health on employment status will differ across different socioeconomic positions as the consequences of poor health also depend on social and labour market circumstances. These

latter circumstances vary across the 11 European countries in our study—for example, by the level of protection for workers with chronic diseases against workforce exclusion and rehabilitation policies, to include people with poor health in regular or sheltered employment.[23] It may be hypothesized that countries wherein a poor health status was a strong predictor for labour force exit were less successful in retaining those with a poor health status in the labour force.[14] An alternative explanation may be that in countries where this association was not observed, health is less important than other factors in determining employment status. Figure 2 suggests that, in countries with a low national unemployment rate, health will compete with other labour market factors in the process of entering or retaining paid employment, whereas in countries with a high national unemployment rate, the effect of health selection out of the workforce is relative small compared with other factors that determine labour opportunities for people. However, this finding does not suggest that in these latter countries, health selection per se is not important, but rather that it cannot be demonstrated in the current analysis.

An important question is what society should do with unhealthy job seekers and unhealthy workers. Preventive public health interventions should not only address the health selection out of the workforce, but also take into consideration that being unemployed can lead to further deterioration of the health status, long-term unemployment, and social exclusion.[23] Ill health is an important determinant for entering and maintaining paid employment in many European countries. These consequences of ill health will increase socioeconomic inequalities in health. It has been reported before that unemployment, retirement, and work disability explain a great deal of health inequalities across European countries.[24]. In policies for health equity, it is of paramount importance to develop public health measures, tailored to socio-demographic characteristics, that include people with a poor health in the labour market and prevent workers with ill health from dropping out of the workforce.

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# 5

## **The effect of re-employment on perceived health**

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## ABSTRACT

**Background:** The relationship between unemployment and poor health has been well established. Unemployment causes poor health and poor health increases the probability of unemployment.

**Methods:** A prospective study with 6 months follow-up was conducted among unemployed subjects receiving social security benefits, who were capable of full time employment and were referred to a re-employment training centre. Re-employment was defined as ending social security benefits for at least three months because of starting with paid employment. Health related quality of life was measured by the Short Form 36 Health Survey (SF-36). A Cox Proportional Hazards analysis was used to determine the factors that predicted re-employment during follow-up. The influence of re-employment on changes in perceived health was investigated with linear regression analysis.

**Results:** Unemployed subjects with a poor health at baseline were less likely to return to paid employment during follow-up. Almost all dimensions of health at baseline had an influence on the likelihood of becoming employed. Among the re-employed subjects, general health, physical functioning, social functioning, vitality, mental health, bodily pain, and role-limitations due to emotional or physical problems improved, with an effect size varying from 0.11 to 0.66.

**Conclusion:** This study provides evidence that re-employment leads to improvement of self-perceived health within a short time window. This suggests that labour force participation should be considered as therapeutic intervention within health promotion programmes among unemployed persons.

## INTRODUCTION

The relationship between unemployment and poor health has been well established, as demonstrated by a higher prevalence of illness and disability[1-2] and a higher mortality among unemployed people.[3] The association between health and employment is bi-directional: unemployment may cause poor health (causation hypothesis), and poor health may increase the probability of unemployment (selection hypothesis).

There is evidence for the selection hypothesis. A longitudinal study among European countries showed that in the majority of European countries a perceived poor health or a chronic health problem predicted becoming or staying unemployed.[4] A community based survey in the United Kingdom found that health related job loss had become increasingly common, especially in relation to musculoskeletal disorders and mental illness.[5] A two-year follow up study of long term unemployed Norwegians reported that health related selection to long term unemployment explained a substantial part of the excess mental morbidity among unemployed people.[6]

However, there is also evidence for the causation hypothesis. Various studies have shown that unemployment gave rise to health effects, especially psychological distress, depression, and reduced mental health. A review of 16 longitudinal studies concerning mental health effect of unemployment concluded that loss of employment affected mental health, but also that gaining employment improved mental health.[7] A British longitudinal study found that transitions from paid employment to various forms of non-employment (unemployment, long-term sick leave, maternity leave) had a negative impact on mental health. Transitions from non-employment to formal employment resulted in an improvement of mental health. The effects were felt most strongly within six months after the transition.[8] A five-year follow up study among long-term unemployed Norwegians reported recovery of mental health after re-employment.[9]

“Work, matched to one’s knowledge and skills and undertaken in a safe, healthy environment, can reverse the harmful effects of prolonged sickness absence or long term unemployment, and promote health, well-being and prosperity”. This is the main message of the so-called Black report, which reviewed the health of Britain’s working-age population[10-11] In a review Waddel and Burton[12] concluded that re-employment leads to clear benefits in psychological health and some measures of well-being, although there is a dearth of information on physical health. A meta-analytic study of the psychological and physical well-being during unemployment also demonstrated that the bulk of research is focused on mental health outcomes, suggesting that other aspects of health need more attention.[13] One study on re-employment indicated that physical as well as mental health improved among those working at one year follow-up compared to those not working.[14] Another study also

showed a positive association between gaining employment and physical functioning among older workers who were displaced.[15] However, both studies were among older workers who were recently displaced or early retired. It is not known whether these results can be generalized to the whole working age population with a different unemployment history.

The impact of re-employment on mental health is reported by two meta-analytic studies.[7, 13] There is limited insight into the effect size of re-employment on other dimensions of health.[13] The aim of this study was to investigate the effect of re-employment on different dimensions of health within a short period after entering paid employment.

## **METHODS**

### **Study population**

A prospective study with 6 months follow-up was conducted among unemployed subjects. The study population consisted of persons on social security benefits who were capable of full time employment and who were referred by the Employment Centre of the City of Rotterdam, The Netherlands, to one of the four re-employment training centres in the area for a re-employment training. Some of the participants did have chronic health problems, but were declared fit enough to be capable of full time employment after investigation by a physician, a psychologist, and an employment specialist. From December 2004 until December 2007, every week an average of 19 subjects was enrolled in the study after referral to a re-employment training centre. In total, 2754 eligible participants were included in the study. Participation in this study was voluntary. The Medical Ethics Committee of Erasmus MC provided a declaration of no objection.

### **Data collection**

The first questionnaire was sent to prospective participants immediately after the referral to the re-employment training centre. The follow-up questionnaire was sent six months later. The procedure of data collection was similar at baseline and follow-up. The first questionnaire was sent to the home address of the participants, followed by two reminders two respectively four weeks later. Additional actions were undertaken to include more subjects. As a large part of the study population had a non-Dutch background, the questionnaire and covering letter were translated in Turkish and sent in addition to the Dutch questionnaire to subjects with a Turkish surname. If subjects



of the study population needed help with filling in the questionnaire, they could get in touch with an interviewer. Subjects who did not reply to the postal questionnaire were visited by an interviewer at their home address with four attempts at different day times during a two week period. The interviewers were matched with the subjects, based on ethnicity, age, and sex, and could offer an interview in the mother tongue (Dutch, Arabic, or Turkish).

### Socio-demographic variables

Socio-demographic variables, such as ethnic background, highest educational level, age, sex, and marital status were included in the questionnaire. Ethnic background of the respondent was based on the country of birth of the mother. In case the mother was born in The Netherlands, the country of birth of the father was leading.[16] Different ethnic groups were defined, based on differences in geographical and cultural distance from the Netherlands. Three ethnic minority groups were defined: 1) Turks and Moroccans, 2) Antilleans and Surinamese, and 3) a miscellaneous group with all other countries of origin. Subjects were divided into three groups according to their highest level of educational attainment. A high educational level was defined as higher vocational training or university, intermediate educational level was defined as higher secondary schooling or intermediate vocational training, and low educational level was defined as no education, primary school, lower and intermediate secondary schooling or lower vocational training. Marital status was used to distinguish those subjects married or living together from others.

### Psychological measures

Mastery was measured by the Personal Mastery Scale[17], which consists of seven items (eg "I have little control over the things that happen to me", "There is little I can do to change many of the important things in my life"), answered on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were calculated, ranging from 1 to 4, with a higher score indicating a higher level of mastery. In case three or more items were unanswered, no score was computed.

Self-esteem was measured with the Rosenberg Self-Esteem Scale[18], with 10 items (e.g., "On the whole, I am satisfied with myself", "All in all, I am inclined to feel that I am a failure"), answered on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were calculated again, ranging from 1 to 4; a higher score indicated a higher level of self-esteem. In case three or more items were unanswered, no score was computed.

## Re-employment training

A re-employment training centre provided a standardized approach of a re-employment training, characterized by a broad re-orientation on employment and employability, enhancement of job search skills, and intensification of job search efforts.

## Re-employment

Start and end dates of the social security benefits were registered at the Employment Centre of the City of Rotterdam, The Netherlands. In these registers, additional information about reasons for ending benefits was also administered. Re-employment was defined as leaving the social security benefit services for at least three months because of starting with paid employment, verified by the national Social Security Agency. Subjects who quitted their registration for a social security benefit for other reasons, for example moving in with a partner or moving out of the city of Rotterdam, were censored from the moment that their benefit payment was quitted by the social security services.

## Health measures

Health related quality of life was measured with the Dutch version of the Short Form 36 Health Survey (SF-36).[19-20] Self-reported health (SRH) was measured with the first item of the SF-36 by asking subjects to rate their overall health on a five-point scale, ranging from 'excellent', very good', 'good' and 'fair' to 'poor'. Those reporting less than 'good health' were defined as having a poor health.[21]

The other 35 items of the SF-36 were used to calculate scores on eight dimensions: physical functioning, general health, mental health, bodily pain, social functioning, vitality, role limitation due to emotional health problems, and role limitation due to physical health problems. Scores could range from 0 to 100, with a higher score indicating a better health related quality of life.

## Statistical analysis

All statistical analyses were conducted by means of the statistical package SPSS (version 15) for Windows and the level of significance was set at 0.05.

In the analyses two groups of respondents were compared, those who were still unemployed at follow-up and those who were re-employed at follow-up. The baseline characteristics of both groups were compared with the chi-square test for dichotomous data and the t-test for continuous data. Non-response to the first questionnaire

and loss-to-follow up during the six months until the second questionnaire were investigated by logistic regression analysis with potential determinants; individual characteristics, perceived health, participation in re-employment training, and re-employment.

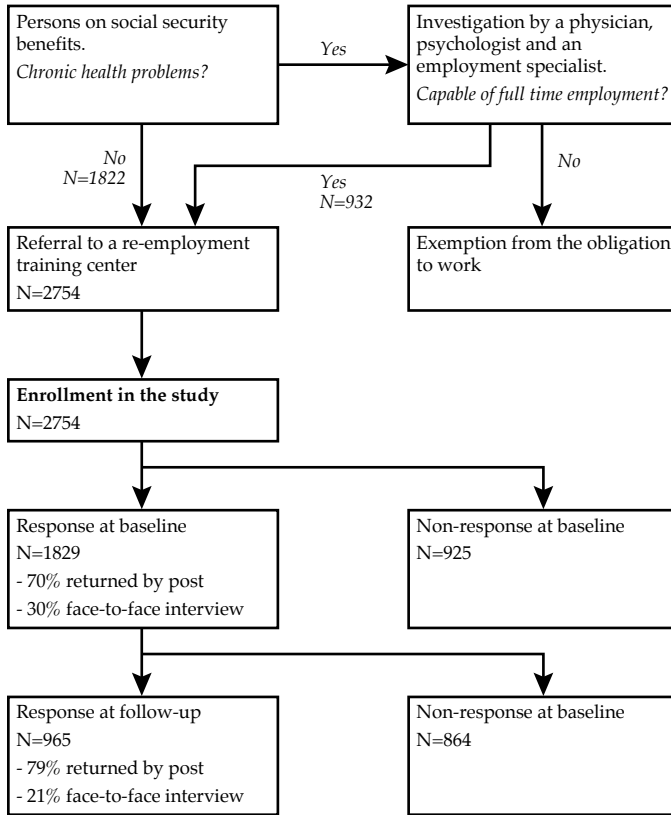
A Cox Proportional Hazards analysis was used to determine the factors that predicted re-employment during the follow-up period. The follow-up period was censored at date of re-employment. Independent factors were individual characteristics, self esteem, mastery, and the eight dimensions of the SF36. Variables were coded in such a manner that a Hazard Ratio above 1 indicates an increased likelihood of re-entering paid employment. For each dimension of the SF36 a standardized Hazard Ratio was calculated based on an average score across items, representing the effect of an increase of one standard deviation in the average score at baseline on the likelihood of entering paid employment. Individual characteristics with a significant univariate effect on re-employment, were entered first in the multivariate model. Subsequently, the health measure with the largest goodness-of-fit in the univariate analysis was entered in the multivariate model. After that, the effect of the other measures of health were investigated for their additional effect on goodness-of-fit.

The association of re-employment with changes in perceived health was investigated with linear regression analysis. The association of re-employment with each dimension of health was adjusted for age, sex, ethnic background, education, duration on benefit, participation in a re-employment training, and also for the baseline value of the health dimension under study. For each dimension of health Cohen's *d* was calculated as measure of effect size by dividing the difference in health before and after re-employment by their pooled standard deviation.[22]

## RESULTS

Figure 5.1 shows that 2754 subjects were enrolled in the study after referral to a re-employment training centre. One third of the subjects ( $n=932$ ) had chronic health complaints, but were declared to be fit enough to be capable of full time employment after investigation by a physician, a psychologist and an employment specialist. From the 2754 subjects who received the first questionnaire, 1829 subjects (66%) filled out and returned the questionnaire. More than two third of the respondents (70%) returned the baseline questionnaire by post, whereas almost one third of the respondents (30%) had a face-to-face interview. Non-response was statistically significantly higher among younger subjects and men.

The response at follow-up was 53% (965/1829). Loss-to-follow up was statistically significantly higher among younger subjects, men, and subjects of non-Dutch origin,



**Figure 5.1** Flow of participants and response at baseline and follow-up

but not related to marital status, employment history, duration on benefit, or health at baseline. Subjects who had started with a re-employment training ( $n=461$ ) were less often lost to follow up ( $OR=0.8$ , 95% CI 0.7-1.0), whereas subjects who had returned to paid employment ( $n=123$ ) were more often lost to follow up ( $OR=1.9$ , 95% CI 1.3-2.7). However, among those who returned to paid employment, health at baseline did not differ significantly between non-respondents ( $n=76$ ) and respondents ( $n=47$ ) at follow-up.

Table 5.1 shows the characteristics of the respondents to the first questionnaire. The mean age of respondents was 39.7 (sd 9.5) years, 49% was man, 57% had a low level of education, 75% belonged to an ethnic minority group, and 43% received social security benefits for more than five years. During the follow-up period 30% of the respondents had started with a re-employment training.

Figure 5.2 shows that health at baseline was better among subjects who returned to paid employment during the follow-up period. All dimensions of health improved

**Table 5.1** Characteristics of respondents to the first questionnaire (n=1829)

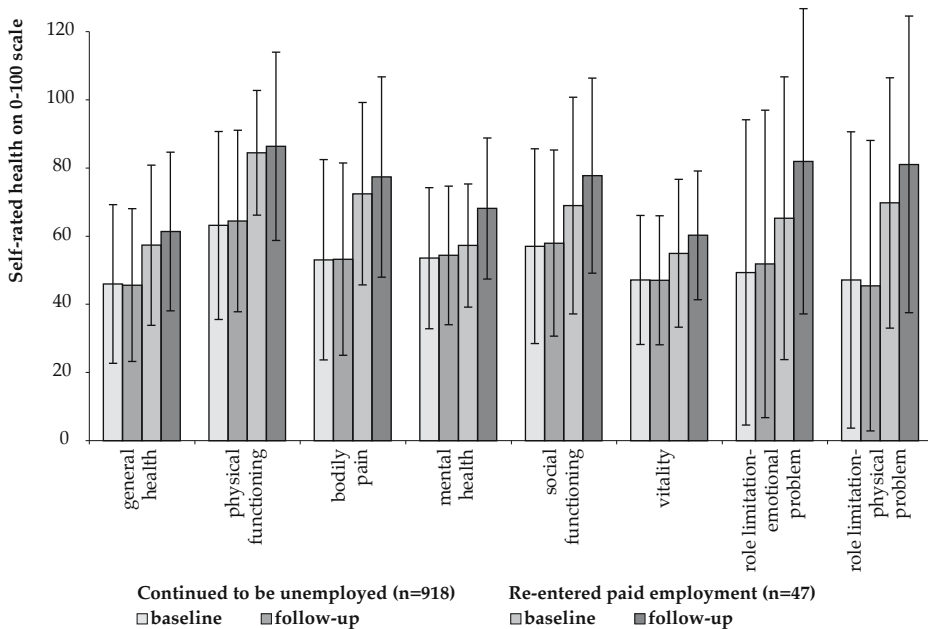
Variable	Respondents n=1829
Age (n - %)	
18-44 yr	1230 (67)
45-64 yr	599 (33)
Men (n - %)	894 (49)
Marital status living with partner (n - %)	601 (33)
Educational level (n - %)	
Higher and intermediate level	634 (35)
Lower level	1049 (57)
Missing	146 (8)
Ethnic background (n - %)	
Native Dutch	450 (25)
Turkish / Moroccan	448 (25)
Antillean / Surinamese	488 (27)
Refugee / Other immigrants	404 (23)
Duration on social benefit (n - %)	
Less than one year	478 (27)
Between 1 and 5 years	512 (29)
5 years and more	759 (43)
Started with re-employment training (n - %)	541 (30)
Self esteem (scale 1-4: mean - sd)	2.48 (0.6)
Mastery (scale 1-4: mean - sd)	2.89 (0.5)

among re-employed subjects, whereas the health status of unemployed subjects remained unchanged.

Table 5.2 shows that unemployed subjects with a poor health at baseline were less likely to return to paid employment during follow-up (OR=0.39, 95% CI 0.2-0.7). All dimensions of perceived health at baseline had an influence on the likelihood of becoming employed, except for mental health. Physical functioning had the strongest influence on the likelihood of becoming employed (OR=2.76, 95% 1.8-4.3). Ethnic background, marital status, self esteem, mastery, and participating in a re-employment training were not significant in the univariate model.

In the multivariate analysis, physical functioning at baseline had the strongest association with re-employment. Due to the correlations of the other health measures with physical health (general health  $r = 0.56$ , bodily pain  $r = 0.62$ , mental health  $r = 0.26$ , social functioning  $r=0.43$ , vitality  $r=0.41$ , role functioning, emotional  $r = 0.27$ , role functioning, physical  $r = 0.55$ ), these measures of health did not have a significant contribution to the multivariate model including physical functioning.

Table 5.3 shows that among the re-employed subjects general health, physical functioning, social functioning, vitality, mental health, bodily pain, and role-limitations due to emotional or physical problems improved during the follow-up period, with an effect size varying from 0.11 to 0.66. The largest relative improvements were observed



**Figure 5.2** Health at baseline and follow-up for subjects who continued to be unemployed (n=918) and subjects who re-entered paid employment (n=47) during the follow-up period of six months

for mental health, social functioning, and role-limitations due to emotional or physical problems, whereas physical functioning showed the smallest relative improvement. For those subjects who remained unemployed the effect sizes varied from -0.04 to 0.06, indicating that their health status remained virtually unchanged during the six months follow-up period. Participation in a re-employment training was not associated with change of health status (data not shown).

## DISCUSSION

Unemployed subjects with a poor health at baseline were less likely to return to paid employment during follow-up. Almost all dimensions of health at baseline had an influence on the likelihood of becoming employed. The strongest association was found between physical functioning at baseline and re-employment. Among the re-employed subjects, general health, physical functioning, social functioning, vitality, mental health, bodily pain, and role-limitations due to emotional or physical problems improved, with an effect size varying from 0.11 to 0.66. Hence, re-employment positively influenced mental health as well as physical health.

**Table 5.2** The influence of individual characteristics and dimensions of self-perceived health among long-term unemployed persons (n=965) on the likelihood of re-employment (n=47) during a follow-up period of six months.  
(Cox Proportional Hazards analysis)

	Re-employment (univariate model)	Re-employment (multivariate model)
	Hazard Ratio (95%CI)	Hazard Ratio (95%CI)
Higher age (>45 years)	0.40 (0.20-0.83)**	0.45 (0.19-1.10)*
Men	2.19 (1.21-3.97)**	1.74 (0.91-3.31)
Low educational level	0.52 (0.30-0.93)**	0.60 (0.32-1.12)
Poor health	0.39 (0.22-0.69)**	-
General health <sup>†</sup>	1.57 (1.20-2.07)**	-
Physical functioning <sup>†</sup>	2.76 (1.80-4.24)**	2.18 (1.40-3.38)**
Bodily pain <sup>†</sup>	1.92 (1.42-2.60)**	-
Mental health <sup>†</sup>	1.19 (0.89-1.59)	-
Social functioning <sup>†</sup>	1.54 (1.13-2.10)**	-
Vitality <sup>†</sup>	1.48 (1.12-1.95)**	-
Role functioning, emotional <sup>†</sup>	1.44 (1.06-1.96)**	-
Role functioning, physical <sup>†</sup>	1.72 (1.25-2.37)**	-

\*\* P<0.05, \* P<0.10

<sup>†</sup> Standardized Hazard Ratio, representing the effect of an increase of one standard deviation in the average score.

**Table 5.3** The influence of re-employment on changes in eight dimensions of health measured by the SF-36 health questionnaire among long-term unemployed persons during a follow-up period of six months.

	Effect of re-employment change <sup>†</sup> (SE) (n=965)	Effect size <sup>‡</sup> (Cohen's d) (n=47)
General health	+ 7.0 (2.7)**	+ 0.18
Physical functioning	+ 9.2 (3.4)**	+ 0.11
Bodily pain	+ 11.3 (3.6)**	+ 0.20
Mental health	+ 11.0 (2.7)**	+ 0.66
Social functioning	+ 14.2 (3.8)**	+ 0.32
Vitality	+ 7.8 (2.5)**	+ 0.26
Role functioning, emotional	+ 22.7 (6.8)**	+ 0.46
Role functioning, physical	+ 20.0 (6.0)**	+ 0.33

<sup>†</sup>. Each linear regression model was adjusted for age, gender, ethnic background, education, duration on benefit, and health at baseline.

<sup>‡</sup>: Effect sizes were based on the mean values of health at baseline and follow-up of the re-employed subjects

Loss to follow up was significantly higher among younger subjects, men, subjects of non-Dutch origin and subjects who had returned to paid employment. However, among those who found employment (n=123), health at baseline did not differ between non-respondents (n=76) and respondents (n=47) at follow up. Therefore, we assume that the effects of re-employment on health were not influenced by selective loss to follow up.

Subjects who were referred to a re-employment training centre were included in the study. The policy of the Employment Centre of the City of Rotterdam was to refer everybody who was able to work and could use some help with searching for a job. Hence, subjects were not included in the study when they were not able (due to health problems) or not obliged (due to family obligations or education) to work. In addition, recently unemployed persons who were supposed to be able to find paid employment by themselves, were not included. This may have affected the results with respect to health status and re-employment probabilities.

The re-employed workers got their jobs at different times during the follow-up period of the study. Therefore, some persons may have been back at work for much longer than others and thus, the length of exposure to the health benefits of re-employment varied amongst the re-employed sample. Unfortunately, due to the small number of persons who gained employment it is not feasible to analyse the relation between time at work and health benefits due to re-employment.

The study is based on self-reported health status. Therefore, justification bias may have influenced the present results. Respondents who were still unemployed at follow up may have reported more easily that they had a poor health than those who found paid employment in order to justify the fact that they did not find a job.[23]

Due to the observational design of the study the results may have been influenced by selection bias. Subjects who found employment differed from those who stayed unemployed with respect to health at baseline and personal characteristics. These variables were adjusted for in the analysis, but there may have been other variables that influenced both health change and re-employment, e.g. motivation to work, that were not included in the analysis. However, two psychological measures that were included in the study, self esteem and mastery, did not have a significant influence on the likelihood of re-employment. In addition, these psychological measures did not influence the estimated effects of re-employment on health.

To control for the systematic differences in health at baseline between the unemployed and re-employed subjects, stratified analyses were conducted showing that re-employment resulted in an increase of health for both subjects with a poor health at baseline as well as subjects with a good health at baseline. In general, subjects with a poor health at baseline showed a larger increase in health after re-employment than subjects with a good health at baseline (data not shown). However, after finding paid



employment the health status of recently re-employed subjects still lagged the health status of long-term employed persons.[24]

Unemployed subjects with a good health were more likely to return to paid employment during follow-up. Therefore, the results of this study support the selection hypothesis. These findings are in accordance with a study of the European Community Household Panel, which found that a poor health or chronic health problem predicted staying or becoming unemployed in European countries.[4] A two year follow up study of long term unemployed in Norway showed that health related selection to long term unemployment explained a substantial part of the excess mental morbidity among unemployed people.[6]

This study also showed that the health status of re-employed subjects improved, whereas the health status of unemployed subjects remained unchanged. Re-employment did not only have a positive influence on mental health, but also on physical functioning, which was in accordance with findings from two other studies[14-15] Based on these finding, it seems most likely that starting with paid employment results in health improvement. However, due to the design of the study it cannot be ruled out that it is the other way around; a change in health status may increase the likelihood of finding paid employment. However, a review showed that an increase in health status of long term unemployed is rather unlikely.[2] Therefore, it is assumed that the health status of participants increased shortly after re-employment, supporting the causation hypothesis. This is in congruence with findings from other studies, which found an increase in mental health status after re-employment. [8-9]

In the present study, an effect size of 0.66 was found for the improvement of mental health after re-employment. This result is in accordance with findings from two meta-analytic studies [7, 13], reporting that gaining employment impacts on mental health with an effect size of 0.54 respectively 0.89. The effects on other dimensions were slightly lower, but since different dimensions of health were associated with each other it is difficult to infer that mental health seems more important than physical health. This is in accordance with the results of the Whitehall II study of civil servants, which showed that physical and mental health were correlated for participants with a low socioeconomic position.[25]

In the current study only 5 % (47/965) of the participants found paid employment within six months. This low re-employment rate is in accordance with a study among persons receiving social security benefits in the city of Amsterdam, the Netherlands, which showed that only 8% of the persons found paid employment in a two-year period from 2004-2006. [26] The current study population is characterised by a long-term unemployment history. Long-term unemployed subjects often have much difficulty in finding paid employment, especially for those with a poor health. All participants in the study were referred to a re-employment training centre for a re-employment

training. However, this re-employment training did not have a positive effect on the probability of re-employment or on the health status of participants. Therefore, other measures seem to be required to increase the chance of re-employment for long term unemployed with a poor health.

In the recent Black report on the health of the British working age population, Black appealed for changing perceptions of fitness for work. Instead of sticking to the idea that one cannot work unless 100% fit, it is recommended that a campaign should be launched to make employers, healthcare professionals and the general public aware that work is in general good for health.[10] This study provides evidence that work is indeed good for your health and, thus, work should be considered as an important part of health promotion programmes among unemployed persons. In policies for health equity public health measures are required to include persons with a poor health in the labour market and to prevent workers with ill health from dropping out of the workforce.

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# 6

## **Effectiveness of a health promotion programme for long-term unemployed subjects with health problems: a randomized controlled trial**

Schuring M, Burdorf A, Voorham AJJ, der Weduwe K, Mackenbach JP

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## ABSTRACT

**Background:** Employment status is an important determinant of health inequalities. Among unemployed persons a poor health decreases the likelihood of re-employment.

**Methods:** A randomized controlled trial with 6 months follow up among unemployed persons with health complaints receiving social security benefits from the city of Rotterdam, the Netherlands. In total, 456 persons were assigned to the control group and 465 persons to the intervention group. The intervention consisted of three sessions weekly over 12 weeks. One session a week was focused on education to enhance the ability to cope with (health) problems and two weekly sessions consisted of physical activities. The primary outcome measures were perceived health, measured by the Short Form 36 Health Survey, and psychological measures mastery, self esteem, and pain-related fear of movement. Secondary outcome measures were work values, job search activities, and re-employment.

**Results:** Enrollment in the intervention programme was 65% and 72% completed the programme with over 70% attendance to all sessions. The intervention had a good reach among subjects with lower education, but had no effect on mental and physical health, mastery, self esteem, and pain-related fear of movement. Participation in the programme had no influence on work values, job search activities, or re-employment.

**Conclusion:** The intervention programme aimed at promotion of physical and mental health of unemployed people with health complaints did not show beneficial effects. The lack of integration into regular vocational rehabilitation activities may have interfered with these findings. It cannot be recommended to implement this particular health programme.

## INTRODUCTION

The relationship between unemployment and poor health has been well established, as demonstrated by a higher prevalence of illness and disability [1-2] and a higher mortality among unemployed people.[3] The association between health and employment is bi-directional: unemployment may cause poor health (causation hypothesis), and poor health may increase the probability of unemployment (selection hypothesis). [4-6]

Work provides a variety of features, including the use of skills, interpersonal contact, and provision of economic resources, that are responsible for psychological well-being and are adversely influenced by job loss and unemployment.[7] Job loss may lead to impaired role and emotional functioning, poor health, and depression.[8] Self-esteem declines with job loss [9] and a low self-esteem is a determinant of self-reported poor health.[10] A poor psychological health will act as a barrier to return to paid employment through a decreased motivation, lowered expectations in finding employment, and ineffective job seeking.[8-9, 11] Thus, unemployment may lead to a poorer health, which in turn will reduce the likelihood of re-employment.

In order to increase the possibilities for re-employment, improvement in health of unemployed persons may, therefore, be an important step. Unemployed persons with chronic health complaints, such as musculoskeletal disorders, may become progressively less healthy, since fear of pain and reinjury may lead to reduced activities [12], resulting in a passive life style with low levels of physical activity.[13-14] Hence, exercises to improve physical activity may be beneficial, not only for those subjects with disorders of the locomotive system, but also for other chronic diseases as well, including heart and pulmonary diseases and depression.[15] Cognitive-behavioural therapy may be needed to target specific pain-related beliefs and coping strategies for modification.[16] Rose and Harris [17] have identified cognitive behavioural therapy as a promising intervention to improve the psychological health of persons who are unemployed. Recently, Watson and colleagues [18] have provided some indications that a combined physical exercise and cognitive behavioural programme improved physical fitness as well as increased employment rates among unemployed participants with health complaints. These results should be interpreted with caution, however, since the voluntary participation in the programme might have biased towards participants with a high motivation and a positive attitude towards (return to) work.

Hence, there is a need for randomized trials on multidisciplinary health intervention on unemployed persons. The aim of the current study (“Work on your health”) was to evaluate the effectiveness of a health promotion programme, consisting of physical exercise and cognitive training, on physical and mental health of unemployed subjects with health complaints.

## METHODS

### Design and study population

The study was designed as a randomized controlled trial (RCT) and approved by the Medical Ethics Committee of the University Medical Center Rotterdam Erasmus MC. Persons on social security benefits who (partly) attributed their inability to find a paid job to their chronic health problems, were referred by the Employment Centre of the City of Rotterdam, The Netherlands, for a fit-to-work test, conducted by a physician, psychologist, and an employment specialist. All participants with health problems and declared to be capable of full time employment were selected as target population for this study. For more than two third of the population (68%) the presence of chronic pain was ascertained by a physician. In addition, subjects were required to understand and speak Dutch at basic level.

### Randomization

Randomization was performed by a researcher with a computer-generated list of random numbers (SAS Software, version 8.12, Cary, NC). At the company that performed the fit-to-work tests, every week the researcher allocated all participants to the intervention group or the reference group. From December 2004 until December 2007, every participant who met the inclusion criteria was randomized. After randomization eligible participants were approached by the research team for participation in the study and asked to provide their written informed consent. This procedure of informed consent after randomization was necessary, since the City of Rotterdam required an immediate referral to an employment service for vocational rehabilitation without further administrative delay, and also required that willingness to participate in the study would not interfere with existing requirements for job search.

The allocation sequence was concealed until the participant had been assigned. The participants and the professionals providing the intervention could not be blinded. However, the persons who were involved in data collection and data entry were blinded, since data collection was conducted completely independent from the intervention and regular vocational rehabilitation.

Figure 6.1 shows the diagram of the flow of participants through the phases of the trial. In total, 465 subjects were assigned to the intervention programme and 456 subjects to the usual care group.



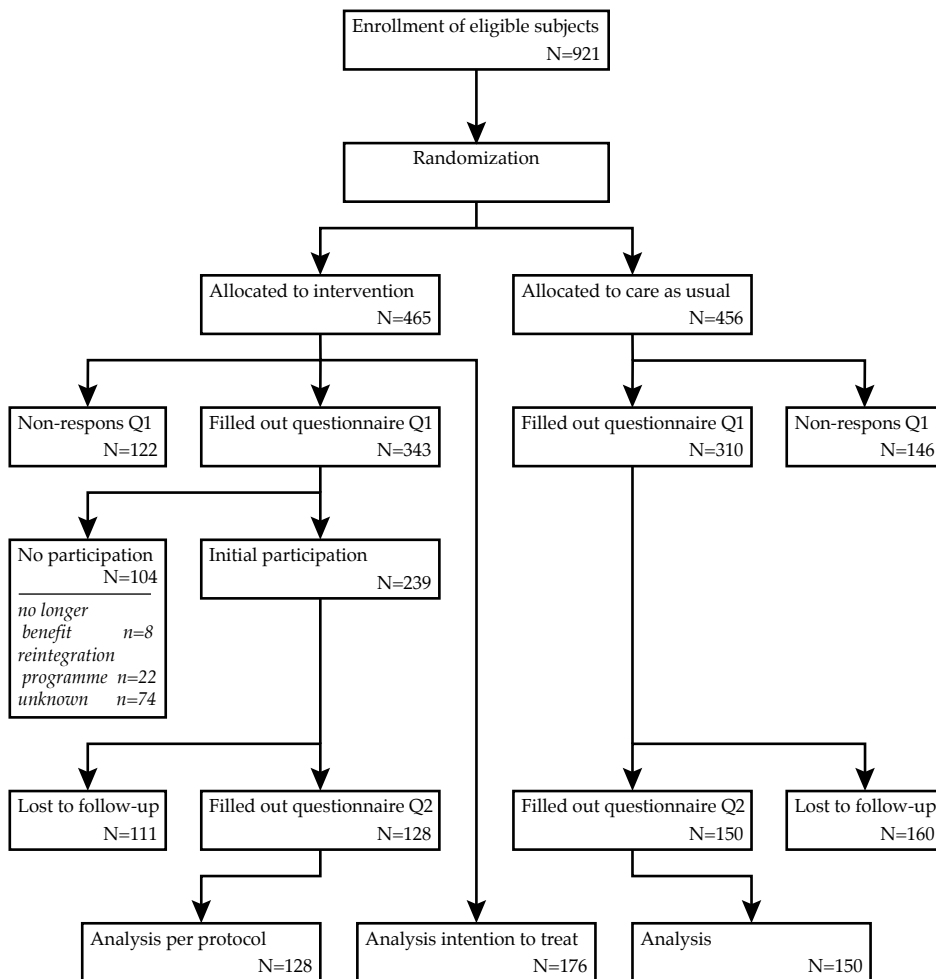


Figure 6.1 Flow of participants through the phases of the trial

### Intervention

The intervention was aimed at changing the way unemployed persons perceive and cope with their health complaints. The rationale was based on the biopsychosocial model of chronic pain and subsequent interdisciplinary pain management approach. Patients with chronic pain are at increased risk for emotional disorders (such as anxiety, depressions, and anger), maladaptive cognitions (such as catastrophizing and poor coping skills), functional deficits and physical deconditioning (due to decreased physical activity and fear of injury). These effects are often interdependent, so that one cannot simply treat one to the exclusion of others. Interdisciplinary pain management

embraces the fact that the comprehensive treatment of all these dimensions is needed in order to be effective.[19]

The intervention consisted of three sessions each week during a 12-week period. Every week one session of three hours was focused on behavioural education and two sessions were focused on physical activity. The behavioural educational component was designed to enhance a participant's insight in his/her health complaints, to increase positive coping with health problems by reducing fear and avoidance of movement, to enhance self-esteem and feelings of mastery, and to improve functioning by learning to think positively and enhance social skills. This part was conducted by two prevention workers.

The physical activity component consisted of two sessions of three hours. The first session comprised of 1.5 hours fitness training (cardio and weight training) and 1.5 hours of indoor sports (e.g. basketball, swimming). The second session comprised of 1.5 hours fitness training and 1.5 hours of outdoor activities. The intervention was designed to make the participants aware that it was safe to move and healthy to be physically active, to extend the social network, to improve daily structure, and to improve general wellbeing. The exercise programme was developed according to the graded-activity principle.[20-22] The exercises started below the average functional capacity assessed during the first session and were increased gradually during the course of the intervention, according to the time-contingency principle. These sessions were conducted by physical education teachers.

### Usual care

Subjects in the reference group were referred to one of the three vocational rehabilitation services in the area. They provided a standardized approach of vocational rehabilitation, characterized by a broad re-orientation on employment and employability, enhancement of job search skills, and intensification of job search efforts. The usual care approach did not include any activity related to health, such as health promotion to increase physical activity in leisure time.

### Data collection

A questionnaire and an informed consent was send to the home address of the participants, followed by two reminders two respectively four weeks later. Additional actions were undertaken to include more subjects. The questionnaire and covering letter were translated in Turkish and send in addition to the Dutch questionnaire to subjects with a Turkish surname. If subjects of the study population needed help with filling in the questionnaire, they could get in touch with an interviewer. Subjects who

did not reply to the postal questionnaire were visited by an interviewer at their home address with four attempts at different day times during a two week period. The interviewers were matched with subjects, based on ethnicity, age, and sex, and could offer an interview in the mother tongue (Dutch, Arabic, or Turkish).

### Socio-demographic variables

Socio-demographic variables, such as ethnic background, education, age, sex, and marital status were included in the study. Ethnic background of the respondent was based on the country of birth of the mother. In case the mother was born in The Netherlands, the country of birth of the father was leading.[23] Different ethnic groups were defined, based on differences in experiences of migration (refugees or labour migrants) and differences in geographical and cultural distance from the Netherlands. Three ethnic minority groups were defined: 1) Turks and Moroccans, 2) Antilleans and Surinamese, and 3) a miscellaneous group with all other countries of origin. Subjects were divided into three groups according to the highest level of educational attainment. A high educational level was defined as higher vocational training or university, intermediate educational level was defined as higher secondary schooling or intermediate vocational training, and low educational level was defined as no education, primary school, lower and intermediate secondary schooling or lower vocational training. Marital status was used to distinguish those subjects married or living together from others.

### Primary outcome measures

#### *Health measures*

Health related quality of life was measured with the Dutch version of the Short Form 36 Health Survey (SF-36).[24-25]. Self-reported health (SRH) was measured with the first item of the SF-36 by asking subjects to rate their overall health on a five-point scale, ranging from 'excellent', very good', 'good' and 'fair' to 'poor'. Those reporting less than 'good health' were defined as having a poor health.[26]

The other 35 items of the SF-36 were used to calculate scores on eight dimensions: physical functioning, general health, mental health, bodily pain, social functioning, vitality, role limitation due to emotional health problems, and role limitation due to physical health problems. Scores could range from 0 to 100, with a higher score indicating a better health related quality of life.

### *Psychological measures*

Mastery was measured by the Personal Mastery Scale [27], which consists of seven items (eg “I have little control over the things that happen to me”, “There is little I can do to change many of the important things in my life”), answered on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were calculated, ranging from 1 to 4, with a higher score indicating a higher level of mastery. In case three or more items were unanswered, no score was computed (Cronbach’s alpha=0.69).

Self-esteem was measured with the Rosenberg Self-Esteem Scale [28], with 10 items (e.g., “On the whole, I am satisfied with myself”, “All in all, I am inclined to feel that I am a failure”), answered on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were calculated again, ranging from 1 to 4; a higher score indicated a higher level of self-esteem. In case three or more items were unanswered, no score was computed (Cronbach’s alpha=0.84).

Kinesiophobia was measured with the Tampa Scale of Kinesiophobia [29], which consists of 17 items on fear of movement and injury (e.g. “It’s really not safe for a person with a condition like mine to be physically active”, “Pain always means I have injured my body”) on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were again calculated, ranging from 1 to 4, with a higher score indicating a higher level of kinesiophobia. In case five or more items were unanswered, no score was computed (Cronbach’s alpha=0.80).

### Secondary outcome measures

Attitudes and values towards paid employment were measured with five questions (e.g., “I would do anything to get a job”, “If you don’t want to work, you take advantage of others”) on a five point scale (strongly agree to strongly disagree). A sum score was also calculated (Cronbach’s alpha=0.30). Job search activities were measured with five questions concerning different types of job search activities (e.g., “writing an application letter”, “searching for vacancies in the newspaper or on the internet”). A sum score was calculated, ranging from 0 (no job search activities) to 5 (many job search activities) (Cronbach’s alpha=0.68). Finally, re-employment was measured with one question (“Do you currently have a paid job?”) on a dichotomous scale (yes/no).

### Process evaluation

At the end of the intervention programme semi-structured interviews were undertaken with ten participants and ten trainers to obtain more qualitative insight into different aspects of the intervention that could be improved in the future.

## Statistical analysis

Based on the sample size calculation with an initial participation of 70% and a loss-to-follow-up of 30% (power of 80%, one-sided significance level 0.05), a difference of 5.0 points (10%) in the scores on health measures between the intervention group and reference group could be detected with 400 persons assigned to both trial arms and 196 persons with complete data collection in each group. With these assumptions a difference of 10% in proportion of entering paid employment between the intervention (15%) and control group (5%) could be detected.

The effects of individual characteristics and physical and mental health on participation in the intervention were investigated by logistic regression analysis. The dependent variables were failure to start with the programme (yes/no) and dropping out of the programme (yes/no). Independent variables with a p-value of 0.10 or less were retained in the multivariate models as well as age and sex by default. In order to compare both analyses, a variable retained in one multivariate model was also included in the other multivariate model.

The baseline characteristics of both groups were compared with the chi-square test for dichotomous data and the t-test for continuous data. The effects of the intervention on outcome measures at 6 months follow-up were analyzed according to the intention-to-treat principle, including all subjects regardless of whether or not they actually received the complete intervention. The analysis was conducted with all available respondents at the time of follow-up and a non-response analysis was conducted to evaluate whether drop-out during the follow-up period was associated with health status or intervention status. An imputation technique for missing responses on health outcomes during follow-up measurements was not used, since the choice for a particular imputation method may influence the estimation of the intervention effect. [30] The effects of the intervention on the continuous outcome measures were evaluated with a mixed effect model for repeated measurements, with the intervention as fixed effect and a compound symmetry covariance structure for the random variation between persons and across persons. This approach estimates the change in an outcome measure between baseline and follow-up, taking into account the baseline value of the outcome measure of interest and the potential confounders age, sex, ethnicity, education, and time on benefits (SAS version 8.12 - procedure Mixed).

The effects of the intervention on the dichotomous outcome measure re-employment was analyzed by a chi-square method (SAS version 8.12 - procedure Surveymeans), adjusted for sex and age. All analyses were carried out with the statistical package SAS version 8.12.

## RESULTS

Figure 6.1 shows that at baseline 921 subjects were enrolled in the study. In the intervention group 343 (74%) persons returned the first questionnaire, which was statistically significantly higher than the 310 (68%) respondents in the reference group. Non-response was not influenced by age or sex.

The response at follow-up did not differ between the intervention group (n=176; 51%) and reference group (n=150; 48%). Loss-to-follow up was statistically significantly higher among men, but not related to age, marital status, education, ethnic

**Table 6.1** Characteristics of the study population and baseline values of outcome measures

Variable	Intervention group (n=343)	Usual care group (n=310)
Age (n - %)		
18-44 yr	194 (52.8)	175 (52.9)
45-64 yr	149 (43.4)	135 (43.6)
Men (n - %)	172 (50.2)	160 (51.6)
Marital status living with partner (n - %)	127 (37.0)	119 (38.4)
Educational level (n - %)		
Higher and intermediate level	113 (32.9)	123 (39.7)
Lower level	230 (67.1)	187 (60.3)
Ethnic background (n - %)		
Native Dutch	88 (25.7)	65 (21.0)
Turkish / Moroccan	90 (26.2)	87 (28.1)
Antillean / Surinamese	89 (26.0)	90 (29.0)
Refugee / Other immigrants	76 (22.2)	68 (21.9)
Employment experience (n - %)		
Never worked	67 (19.9)	60 (19.8)
Less than 5 years	117 (34.7)	107 (35.3)
5 years and more	153 (45.4)	136 (44.9)
Duration on social benefit (n - %)		
Less than one year	58 (16.9)	53 (17.1)
Between 1 and 5 years	85 (24.8)	73 (23.6)
5 years and more	200 (58.3)	184 (59.4)
Health outcome measures (mean - sd)		
General health (0-100)	37.4 (18.5)	37.4 (19.8)
Physical functioning (0-100)	52.8 (23.7)	53.5 (24.8)
Bodily pain (0-100)	41.0 (23.1)	43.0 (24.5)
Mental health (0-100)	52.5 (19.1)	54.0 (20.0)
Social functioning (0-100)	52.2 (26.1)	52.6 (27.7)
Vitality (0-100)	43.4 (16.6)	45.7 (18.1)
Psychological outcome measures (mean-sd)		
Self-esteem (1-4)	2.9 (0.6)	2.9 (0.6)
Mastery (1-4)	2.4 (0.6)	2.4 (0.6)
Kinesophobia (1-4)	2.7 (0.5)	2.7 (0.5)
Poor health (n - %)	281 (81.9)	252 (81.3)

**Table 6.2** Number of subjects who started with the health programme, who continued their participation throughout the programme, and subjects who dropped out during the programme.

	Number of subjects N (%)	Number of respondents to the first questionnaire N
Allocated to intervention	465	343
Initial participation	300 (65)	239
Continued participation (> 70% attendance to all sessions)	215 (72)	172
Dropout:		
Between 50-70% participation	41 (14)	30
Less than 50% participation	44 (15)	37

background, work experience, duration on benefit, or health at baseline. Within the intervention group, participation in the intervention was not associated with response on the follow-up questionnaire.

Table 6.1 shows that the randomization was successful in creating study groups with similar demographic characteristics and physical and psychological health at baseline.

Among the 465 subjects who were allocated to the intervention group, 300 subjects (65%) initially started with the health programme. During the health programme 85 subjects (28%) dropped out of the intervention due to an attendance level below 70% of all session offered (table 6.2). Initial participation was not influenced by age, ethnic background, educational level, marital status, employment history, or perceived health. Men were more likely to not enter the intervention programme (OR=1.5). Subjects dropping out of the programme reported poorer physical and mental health at baseline (table 6.3). High fear of movement at baseline did have a significant effect on dropping out of the programme in the univariate model (OR=2.0 95% CI 1.0-3.9). However, due to the associations of fear of movement with mental health ( $r=0.3$ ) and

**Table 6.3** Logistic regression analysis on the effects of individual characteristics and mental and physical health on failure to start with the programme or dropping out during the programme

Variable	Not starting with programme (n=104/343) OR (95% CI)	Dropping out (n=67/239) OR (95% CI)
Age		
18- 44 yr	1.0	1.0
45-64 yr	0.7 (0.4-1.1)	0.9 (0.5-1.7)
Men	1.5 (0.9-2.5)*	0.9 (0.5-1.7)
Health outcome measures (standardised values)		
Physical functioning	1.0 (0.8-1.3)	0.8 (0.5-1.1)*
Mental health	1.0 (0.8-1.3)	0.7 (0.5-1.0)*

\* 0.05 < P < 0.10

OR odds ratio, CI confidence interval.

physical functioning ( $r=0.4$ ), the effect of fear of movement on dropping out of the programme was not significant in the multivariate model.

### Effects of the intervention

Table 6.4 shows that the intention-to-treat analysis demonstrated no beneficial effects of the intervention on health and psychological outcome measures. There was no effect on employment status at 6 months follow up (re-employment: 2.0% in reference group versus 2.2% in intervention group, estimated difference 0.3% (-1.9%-2.3%)). In addition, attitudes and values towards paid employment, and job search activities were not altered by the intervention. The effect sizes of the individual parameters as well as the sum scores across scales were all close to unity (data not shown)

**Table 6.4** Outcome measures at follow up in the intervention and usual care group and the estimated effect of the intervention

	No. of participants intervention/ usual care	Intervention group mean (sd)	Usual care group mean (sd)	Estimated effect (difference)
Health outcome measures				
General health (0-100)	172/146	40.7 (18.6)	36.9 (22.3)	1.1 (-0.9 - 3.0)
Physical functioning (0-100)	174/147	54.9 (24.2)	53.8 (25.2)	0.1 (-2.2 - 2.5)
Bodily pain (0-100)	173/147	45.6 (24.5)	44.5 (23.9)	0.7 (-1.7 - 3.2)
Mental health (0-100)	173/148	54.8 (17.8)	53.4 (21.7)	0.4 (-1.5 - 2.3)
Social functioning (0-100)	173/149	55.1 (23.3)	53.7 (28.2)	0.5 (-2.3 - 3.3)
Vitality (0-100)	173/148	45.1 (16.7)	43.8 (18.7)	0.6 (-1.2 - 2.4)
Psychological outcome measures				
Self-esteem (1-4)	172/146	2.8 (0.6)	2.9 (0.6)	-0.06(-0.1 - 0.0)
Mastery (1-4)	161/135	2.5 (0.6)	2.5 (0.7)	-0.05(-0.1 - 0.0)
Kinesophobia (1-4)	172/146	2.6 (0.5)	2.7 (0.5)	-0.01(-0.1 - 0.1)

Difference was adjusted for age, sex, ethnic background, education, duration on benefit and also for baseline values of health and psychological measures.

### Subgroup analyses

A per protocol analysis of subjects who initially participated in the intervention and a subgroup analysis of subjects who participated at least 70% of the intervention did not show positive effects of the intervention. (data not shown)

Subgroup analyses based on subjects with musculoskeletal complaints or subjects with psychological complaints showed that the intervention was not effective in either subgroup. The effect sizes were all close to unity and did not differ from the overall effect size (data not shown)



## Effect of a co-intervention

During the follow-up of 6 months, 80 subjects in the intervention group (23%) and 56 subjects in the reference group (19%) started with a job search training. This co-intervention did not influence the observed lack of any effect of the intervention.

## DISCUSSION

The health promotion programme did not show positive effects on perceived mental and physical health, self esteem, mastery, and fear of movement. In addition, values and attitudes towards paid employment, job search activities, and employment status at six months follow up were not affected by the health programme either.

There are three possible reasons why the intervention was not effective: 1) the study could not demonstrate an effect due to methodological limitations; 2) the intervention was not successfully implemented; or 3) the intervention was indeed not effective in this form.

### Methodological limitations

Eligible participants were randomized before they were approached by the research team for participation in the study. This procedure was necessary since the City of Rotterdam required an immediate referral to an employment service without further administrative delay. As a consequence of this procedure, the non response on the first questionnaire after randomization was relatively high. The response to the first questionnaire was slightly higher in the intervention group (74%) compared with the reference group (68%). Receiving an invitation to participate in a health programme may have influenced the decision to fill out the questionnaire, but this had little influence on the comparability of intervention and reference group.

Data collection was conducted completely independent from the intervention programme and regular vocational rehabilitation, since participation in these activities was partly mandatory, whereas participation in this study was completely voluntary. As a consequence, some subjects who filled out the questionnaire did not take part in the intervention, whereas other subjects took part in the intervention but did not respond on the questionnaire. For most subjects the reason for not taking part in the intervention or the vocational rehabilitation was unknown, although a small proportion was due to termination of the benefits for different reasons (moving in with a partner or moving out of the city of Rotterdam). However, participation in the intervention was not influenced by personal characteristics, employment history, or

perceived health. Therefore, it is assumed that there was no selection bias in initial participation in the programme.

The power calculation was based on 196 subjects per group with complete data collection. In fact, the achieved sample was considerably less. Since the estimated effects of the intervention were close to unity for all parameters, a larger study population would not have resulted in statistically significant effects of the intervention. Therefore, it is assumed that the failure to detect between-group differences is not due to a lack of power of the study.

In this study perceived health was an important outcome measure, whereas the focus of the intervention programme was also on improving objective physical health. In the intervention group it was shown that a better cardio respiratory fitness did not result in a better perceived health.[31]

Another methodological reason for not finding any effect of the health programme may have been the absence of an assessment of change immediately after the end of the intervention. Theoretically, there could have been a positive effect on health directly after the programme was finished, which had already faded away at the time of follow up, on average about three months after the programme termination. However, this would imply a lack of sustainability of the intervention. In the design of the study a vocational training directly after the end of the health program was thought to be able to sustain positive effects of the intervention. However, in practice the vocational training was often delayed or did not start at all. Due to organisational problems of the social security service and vocational rehabilitation centres only 23% of the intervention group and 19% of the control group started with a vocational training within the follow up period of six months. This lack of follow-up activities concerning vocational rehabilitation can be considered as an implementation failure and may have interfered with our results.

### The intervention was not successfully implemented

The intervention was offered during two years in eight periods with three groups per period. In total, 22 groups started with the programme with 11 to 22 participants per group. Theoretically, each programme consisted of 12 weeks of multidisciplinary rehabilitation. In practice, however, participants received only nine weeks of effective training, since three weeks were lost due to the time it took for the introduction and intake and outtake activities.

Participation in the health programme was mandatory, but the social security service of the city of Rotterdam did not strictly enforce actual participation. The mandatory nature has undoubtedly resulted in an increased participation. Participants who fell obliged to join, may not have experienced a need to improve their health. Feedback

provided by the physical education teachers indicated that getting participants involved was a major challenge in itself and that an increase in training effort in a time-contingent manner will certainly not have been achieved by all participants. Hence, the graded activity principle was not adhered to for all participants.

Interviews with ten participants and the trainers revealed that the cognitive training was not well adapted to this study population of persons with low education and low socio-economic status. Both trainers and participants acknowledged that the cognitive training should be improved with less focus on theory and being more adapted to experiences in daily life of the participants.

Among the persons who initially started with the intervention, 72% completed the programme with more than 70% attendance to all sessions offered. Hence, the intervention had a good reach among subjects who are usually difficult to engage in health promotion activities. Only 28% did not succeed to participate in at least 70 % of the programme activities. Participants with a poor physical and mental health and high fear of movement at baseline had a higher chance of dropping out during the programme compared to persons with a good health and no fear of movement. This may have affected the effectiveness of the health programme, because those persons who could potentially benefit the most dropped out of the programme. However, a subgroup analysis of the subjects who participated in at least 70% of all sessions in the programme versus the reference group, did not show any positive effects of the intervention.

The intervention was indeed not effective in this form.

A systematic review concluded that only intensive (>100 hours) multidisciplinary rehabilitation will reduce pain and improve function in patients with chronic low back pain.[32] Based on this criterion, it is assumed that the intensity of our programme was high enough (around 108 hours), but the subgroup analysis showed that participants with low back pain did not improve in their pain, physical function, or any of the other outcome measures in the current study. Bendix et al.[12] showed that a multidisciplinary intensive programme that ran for 3 successive weeks of 39 hours per week was effective, whereas the health programme under study ran for 12 successive weeks with 9-12 hours per week. A more intensive programme with a shorter duration may be more effective than a less intensive programme with a longer duration.

An anticipated result of the health programme was a higher re-employment in the intervention group. A multidisciplinary rehabilitation programme, described by Watson et al. [18], with a strong focus on improvement in the ability to work and on actual return to work, showed that at 6 months follow-up 38% of subjects were employed and another 23% were in voluntary work of education/training. In contrast, in the

health programme offered in Rotterdam return to work was not part of the individual goal setting. The lack of a strong integration of the health-oriented intervention into the regular vocational rehabilitation activities may have impeded beneficial effects. Patel et al. [33] has suggested that multidisciplinary approaches should not only be concerned with medical and psychological issues, but should also address the obstacles to return to work as seen by the patient.

The process evaluation showed that after the end of the programme, most people fell back into their old lifestyle with low levels of physical activity. In order to have sustainable effects of a health promotion programme, it is important that participants continue to be physically active. The absence of a sustained effort by health counselors after termination of the intervention to encourage participants to stay physically active may have contributed to the fact that no health effects were found.

In conclusion, the intervention aimed at the promotion of physical and mental health of unemployed persons with health complaints did not show any beneficial effects. Thus, it cannot be recommended to implement this particular health promotion programme to counteract at individual level the negative effects of unemployment on health. Measures on societal level to reduce the negative effects of unemployment on population health are required [11]. In policies for health equity, it remains of paramount importance to develop measures to include people with a poor health in the labour market.

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**Changes in physical health among participants  
in a multidisciplinary health programme  
for long-term unemployed persons**

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## ABSTRACT

**Background:** The relationship between poor health and unemployment is well established. Health promotion among unemployed persons may improve their health. The aims of this study were to investigate characteristics of non-participants and drop-outs in a multidisciplinary health promotion programme for long-term unemployed persons with health complaints, to evaluate changes in physical health among participants, and to investigate determinants of improvement in physical health.

**Methods:** A longitudinal, non-controlled design was used. The programme consisted of two weekly exercise sessions and one weekly cognitive session during 12 weeks. The main outcome measures were body mass index, blood pressure, cardio respiratory fitness, abdominal muscle strength, and low back and hamstring flexibility. Potential determinants of change in physical health were demographic variables, psychological variables (self-esteem, mastery, and kinesiophobia), and self-perceived health.

**Results:** The initial response was 73% and 252 persons had complete data collection at baseline. In total, 36 subjects were lost during follow-up. Participants were predominantly low educated, long-term unemployed, and in poor health. Participation in the programme was not influenced by demographic and psychological factors or by self-reported health. Drop-outs were younger and had a lower body mass index at baseline than subjects who completed the programme. At post-test, participants' cardio respiratory fitness, abdominal muscle strength, and flexibility had increased by 6.8%-51.0%, whereas diastolic and systolic blood pressures had decreased by 2.2%-2.5%. The effect sizes ranges from 0.17-0.68.

**Conclusions:** Participants with the poorest physical health benefited most from the programme and sex differences in improvement were observed. Physical health of unemployed persons with health complaints improved after participation in this health promotion programme, but not sufficiently, considering their poor physical health at baseline.



## INTRODUCTION

The relationship between unemployment and poorer health has been well established. [1-3] This relationship is bi-directional with both a selection mechanism with poor health reducing the likelihood on paid employment, and a causation mechanism whereby unemployment will result in a poorer health. [1, 4] These associations may be mediated by other variables, such as health behaviour and psychosocial variables. A low self-esteem, for instance, is a determinant of self-reported poor health [5] and also decreases the likelihood of employment. [6-8] Thus, unemployment may lead to poorer health, which in turn reduces the chances of reemployment.

In order to improve the possibility for reemployment, improvement in health of unemployed persons may, therefore, be an important step. Pedersen and Saltin [9] have concluded in their extensive review that exercise therapy has positive effects on maximum oxygen uptake ( $VO_2\text{max}$ ), muscle strength, general well-being, blood pressure, weight, body fat percentage, and depressive symptoms of persons with chronic diseases. There is some evidence that physical and mental health are interrelated and that determinants of physical health may also positively affect mental health and vice versa. Mastery or the sense of control over one's life, and self-esteem have been associated with a better self-reported physical health. [5]

There is, however, limited research into the effects of exercise-based programmes among groups with a poor health in a low socio-economic position. A low socio-economic position and a poor health have consistently been associated with non-participation and drop-out in health programmes. [10-14] In addition to this, it is important to identify determinants of non-compliance which may influence the effects of exercise programmes. [15]

Watson and colleagues [16] provided some indications that a combined physical exercise and cognitive behavioural programme improved physical fitness as well as increased employment rates among unemployed participants. These results should be interpreted with caution, however, since the voluntary participation in the programme might have biased towards participants with a high motivation and a positive attitude towards (return to) work.

There is a clear need for more insight into ways to improve health of persons in a low socio-economic position. An intensive, multidisciplinary health programme was developed for unemployed persons with health complaints ("Work on your health"), consisting of physical exercise and cognitive training, with the goal to improve physical and mental health as a contribution to increase the opportunities on paid employment. The aims of the present study were (1) to identify the factors that determined non-participation, drop-out, and non-compliance in a health promotion programme

for unemployed persons, (2) to evaluate the changes in physical health among participants, and (3) to investigate the determinants of improvement in physical health.

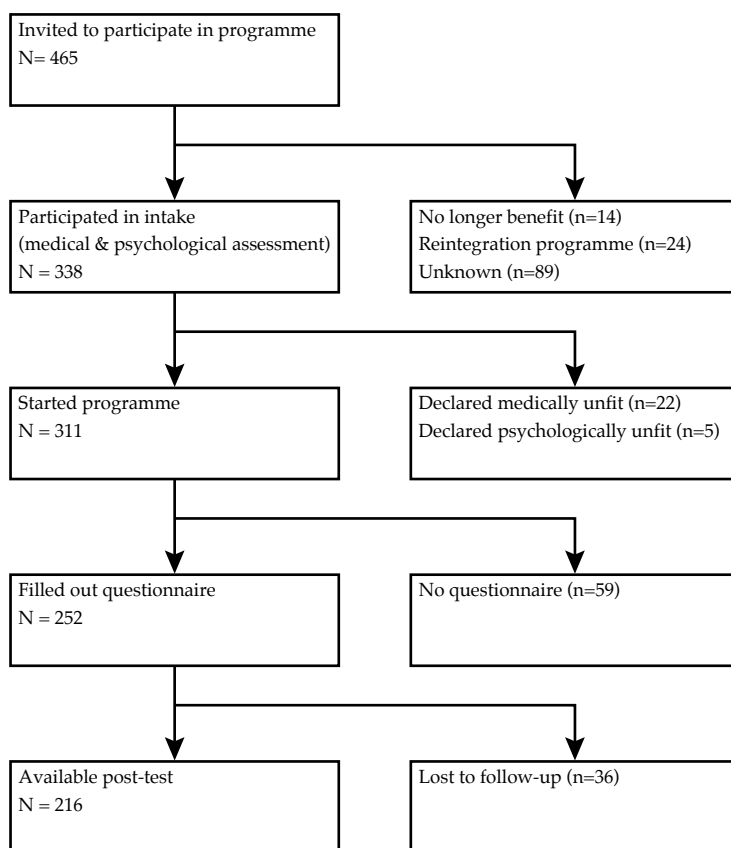
## METHODS

### Study design and population

A longitudinal, non-controlled design was used among participants in a health promotion programme. Unemployed persons with chronic health complaints were referred by the Employment Centre of the City of Rotterdam, The Netherlands, for a fit-to-work test, conducted by a physician, psychologist, and an employment specialist. Participants were selected on the basis of the following criteria: unemployed, diagnosed with chronic health complaints by the physician or a psychologist, but considered to be capable of full time employment, and being at least moderately able to understand and speak Dutch. From December 2004 until December 2007 participants were included in the study. The invitation to participate in the health promotion programme was sent out by the provider of this programme, with a supporting letter from the city of Rotterdam stipulating that attending the programme for at least 70% was more or less mandatory, and that refusal might result in a cut in the social benefits received. The research group carried out the current evaluation study and participation was strictly voluntary. Before the start of the programme, participants were sent a questionnaire and prepaid return envelope. For those with a Turkish last name (a large ethnic minority), a Turkish version of the questionnaire was sent as well. Another large ethnic minority group are the Moroccan people. However, it was not possible to make a Moroccan-Arabic questionnaire because the majority of the Moroccans in the Netherlands speak Berber, which is not a written language. After two and four weeks, reminder letters and questionnaires were sent to the participants. If, after four weeks, still no questionnaire had been sent back, an interviewer visited the home address. When four visits during different hours in a two-week period were not successful, a participant was considered a non-responder. The interviewers were matched with subjects, based on ethnicity, age, and sex, and could offer an interview in the mother tongue (Dutch, Arabic, or Turkish). The Medical Ethics Committee of the Erasmus MC, Rotterdam approved the study.

Of the 465 subjects who were invited to take part in the health promotion programme, 338 participated in an assessment to evaluate medical and psychological eligibility to start the programme (response 73%). The reasons for non-participation (n=127) were not receiving a social security benefit anymore (n=14), being allocated to a reintegration or educational programme (n=24), and unknown (n=89). In addition,

22 individuals were declared medically unfit to successfully participate in the physical training and another 5 individuals were excluded for major psychological problems. In total, 311 persons started the programme, of which 252 also filled out the questionnaire send out by the research team. In total, 216 out of 252 individuals completed the health promotion programme (86%) and 36 subjects were lost to follow-up (Figure 7.1).



**Figure 7.1** Flow diagram of participation in the health promotion programme

## The programme

The intervention was aimed at changing the way unemployed persons perceive and cope with their health complaints. The rationale was based on the biopsychosocial model of chronic pain and subsequent interdisciplinary pain management approach. Patients with chronic pain are at increased risk for emotional disorders (such as

anxiety, depressions, and anger), maladaptive cognitions (such as catastrophizing and poor coping skills), functional deficits and physical deconditioning (due to decreased physical activity and fear of injury). These effects are often interdependent, so that one cannot simply treat one to the exclusion of others. Interdisciplinary pain management embraces the fact that the comprehensive treatment of all these dimensions is needed in order to be effective. [17]

The health promotion programme consisted of three sessions of three hours every week during a twelve-week period. One session a week was focused on cognitions and two weekly sessions were focused on physical activity. The cognitive component was designed to enhance participants' insight in their health complaints (e.g. movement may be painful, though harmless) and how to cope with these complaints, to enhance self-esteem and feelings of mastery, to reduce fear and avoidance of movement, and to improve social functioning by learning to think positively and increase social skills. The cognitive component, conducted by two prevention workers, was primarily facilitating the physical activity part of the intervention. The exercise programme consisted of 1.5 hours fitness training twice a week (cardio and weight training), 1.5 hours of indoor sports weekly, and 1.5 hours of outdoor activities weekly. This part of the programme was primarily designed to improve physical fitness. The exercise programme was developed according to the graded-activity principle. The exercises started below the average functional capacity assessed during the first session and were increased gradually during the course of the intervention, according to the time-contingency principle. These sessions were conducted by physical education teachers. The intervention costs were approximately €2300 per participant who enrolled in the programme.

### Outcome measures

Seven physical health indicators were measured at start and end of the programme by the provider of the programme: Body Mass Index (BMI) in kg/m<sup>2</sup>, body fat percentage, systolic and diastolic blood pressure, cardio respiratory fitness, abdominal muscle strength, and low back and hamstring flexibility. Body fat percentage was determined by means of a bioelectrical impedance analysis with a body fat meter.[18] Blood pressure (mmHG) was measured with an automatic sphygmomanometer at the left wrist.

Cardio respiratory fitness was measured by the Åstrand Ergometer Bicycle test of maximum oxygen absorption (VO<sub>2</sub>max in ml/kg/minute) (Åstrand and Kodahl, 1986). Participants cycled on a bicycle ergometer with a constant peddling rate of 70-75 rotations/minute. The work load was adjusted to the participant's heart rate, which had to be approximately 120 beats per minute after two minutes. Subsequently, the participant cycled for six minutes. If the heart rate fluctuated more than five beats in

the last minute, the test was prolonged until a steady pulse was obtained for at least one minute.  $VO_{2max}$  was estimated on basis of the average heart rate in the last minute, workload, sex, and age. The test was carried out under standardized conditions with the temperature between 18 and 20°C and atmospheric humidity between 40 and 60%. Before the test, participants rested five minutes, and they had to abstain from eating, drinking coffee, and smoking for two hours, from alcohol for twelve hours, and from vigorous physical activity and sunbathing for six hours. If the participant was not able to cycle with a heart rate of 120 beats per minute or if the heart rate exceeded 170 beats per minute, the test was terminated.

Abdominal muscle strength was determined as the number of sit-ups per minute, with knees bent (90°) and feet and hands on the floor. Shoulders had to stay above the floor during the test. Hands had to reach a line at 7.5 cm from the starting position (Fitness Canada). Low back and hamstring flexibility (cm) was measured with a sit-and-reach test, selecting the best of three trials. Participants placed their foot soles, without shoes, against the end of a box. Arms were stretched forward as far as possible with unbent knees and the reach was determined (cm) on the box scale (Fitness Canada).

## Determinants

Determinants of (change in) health were demographic characteristics (sex, age, educational level, ethnicity, and marital status), duration of unemployment, mastery, self-esteem, kinesiophobia, and self-perceived health. Educational level was measured as the highest level of educational attainment in three categories. A high educational level was defined as higher vocational training or university, intermediate educational level as higher secondary training or intermediate vocational training, and low educational level as no education, primary school, lower and intermediate secondary training or lower vocational training. Ethnicity was based on the mother's country of origin; in case the mother was native Dutch, the father's country of origin was leading. Four ethnic groups were defined: Native Dutch, Turkish and Moroccan, Antillean and Surinamese, and other. Turkish and Moroccan people have a similar immigration history with limited acculturation. Antillean and Surinamese people originate from former Dutch colonies and are reasonably integrated in Dutch society by virtue of speaking Dutch. The other ethnic group is a heterogeneous mixture of a large number of nationalities. Marital status distinguished between subjects living without a partner and subjects being married or living with a partner.

Mastery was measured by the Personal Mastery Scale [19], which consists of seven items (eg "I have little control over the things that happen to me", "There is little I can do to change many of the important things in my life"), answered on a four

point Likert scale (strongly agree to strongly disagree). Average scores across items were calculated, ranging from 1 to 4, with a higher score indicating a higher level of mastery. In case three or more items were unanswered, no score was computed (Cronbach's  $\alpha=0.69$ ).

Self-esteem was measured with the Rosenberg Self-Esteem Scale [20], with 10 items (e.g., "On the whole, I am satisfied with myself", "All in all, I am inclined to feel that I am a failure"), answered on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were calculated again, ranging from 1 to 4; a higher score indicated a higher level of self-esteem. In case three or more items were unanswered, no score was computed (Cronbach's  $\alpha=0.84$ ).

Kinesiophobia was measured with the Tampa Scale of Kinesiophobia [21], which consists of 17 items on fear of movement and injury (e.g. "It's really not safe for a person with a condition like mine to be physically active", "Pain always means I have injured my body") on a four point Likert scale (strongly agree to strongly disagree). Average scores across items were again calculated, ranging from 1 to 4, with a higher score indicating a higher level of kinesiophobia. In case five or more items were unanswered, no score was computed (Cronbach's  $\alpha=0.80$ ).

Self-perceived health was measured with the Short Form 36 Health Survey (SF-36) [22]. The SF-36 consists of 36 questions about health, covering eight dimensions: physical functioning, general health, mental health, bodily pain, social functioning, vitality, role limitation due to emotional health problems, and role limitation due to physical health problems. Scores may range from 0 to 100 with a higher score indicating a better self-perceived health.

To measure programme compliance, participants' training attendance records were kept. Subjects were considered compliant when they attended at least 70% of all sessions. The cut-off point of 70% attendance of all sessions was in line with the policy of the social security services, which demanded an attendance of at least 70% from participants.

## Statistical analyses

All statistical analyses were conducted by means of the statistical package SPSS (version 13) for Windows and the level of significance was set at 0.05.

Differences between participants and non-participants, between drop-outs and completers, and between compliers and non-compliers were evaluated by chi square tests and one-way analyses of variance.

The dependent measures of physical health in the statistical analyses were BMI, body fat percentage (%), systolic and diastolic blood pressures (mmHg), VO<sub>2</sub>max (ml/kg/minute), abdominal muscle strength (sit-ups/minute), and flexibility (cm). To in-

investigate which determinants were associated with these measures of physical health at baseline, univariate linear regression analyses were conducted with demographic characteristics, psychological factors, and self-perceived health as independent variables. Subsequently, independent variables of interest ( $p$ -value  $< 0.10$ ) were included in the multiple regression analysis for each physical outcome measure and variables were retained in the final multivariate linear regression model when statistically significant ( $p < 0.05$ ) or statistically significant in a multivariate model on another outcome measure. For each independent variable based on an average score across items also the standardized regression coefficient was calculated, representing the effect of an increase of one standard deviation in the average score on the magnitude of the outcome measure. All analyses were corrected for the duration between the date of filling out the questionnaire and the date of collecting the physical health measures in the test. Body fat percentage correlated highly with BMI ( $r = 0.72$ ) and, hence, only BMI was further analysed. Mastery correlated with self-esteem ( $r = 0.46$ ) and the inclusion of both variables in the same model created problems with multicollinearity, resulting in substantially higher confidence intervals and, thus, non-significant results. Self-esteem was strongest associated with the outcome measures of interest and selected for further presentation. The SF-subcales were interrelated ( $r$  varying from 0.25 to 0.63). Based on the univariate analyses, physical functioning was chosen, since it had the strongest associations with several outcome measures.

The changes in physical health during the health promotion programme were evaluated by six paired-samples  $t$ -tests and Cohen's  $d$  was calculated as measure of effect size by dividing the differences between pre-test and post-test by their pooled standard deviation. [23] Due to regression to the mean, the phenomenon that extreme scores fall back towards the average when measured again, the initial value at baseline will be associated with the observed change over time. [24-25] In order to investigate whether changes in physical health were due to regression to the mean or to differential response to the health promotion programme, the measures of physical health at baseline were classified into three categories: below 25% percentile, interquartile range (p25-p75), and above 75% percentile. Regression to the mean will be present when subjects with a poor physical health (lower quartile) improve and subjects with a good physical health (upper quartile) deteriorate likewise. In linear regression analyses with repeated measurements, the determinants of improvement in physical health were evaluated by introducing interaction terms of the initial physical health values, expressed as categorical variables, with time of measurement as fixed effects in the analysis. Similarly, interaction terms of significant determinants of physical health at baseline with time of measurement were investigated, adjusted for initial values of physical health. In these analyses the random variance components were pooled across all determinants and assumed to be equal across time. This assumption

of a compound symmetry covariance structure resulted in the most restrictive error structure possible, necessary because of the small number of subjects available for some physical health measures.

## RESULTS

### Baseline characteristics of the participants

Of all participants with complete baseline information ( $n = 252$ ), 46% was male, 75% belonged to an ethnic minority, 68% had a low level of education, and 72% reported being unemployed for at least 5 years or had never worked (Table 7.1). On average, participants had a low self-perceived health, a low  $VO_2\text{max}$ , and the prevalence of overweight and obesity was high. No correlations were found between SF-36 subscales and physical health outcome measures, except for abdominal muscle strength (physical functioning:  $r = 0.24$ , mental health:  $r = 0.20$ , general health:  $r = 0.16$ ).

### Characteristics of non-participants, drop-outs, and non-compliers

Based on the information obtained by the questionnaires, subjects who started the health programme did not differ statistically significantly from non-participants with respect to demographic and psychological variables and self-perceived health. Subjects who completed the programme (ie, attended both pre-test and post-test) had a higher BMI at baseline (2.33, 95%CI 0.26-4.41) and were older (3.98, 95% CI 0.78-7.18) than drop-outs. Of all subjects who completed the programme, 82% attended at least 70% of the sessions. Compliant persons had a statistically significantly higher physical functioning (7.97, 95% CI 0.15-15.78) and less kinesiophobia (0.23, 95% CI 0.07-0.39) at baseline than non-compliant persons.

### Determinants of physical health at baseline

Sex, age, marital status, self-esteem, and self-perceived physical functioning were determinants for physical health at baseline, although not for all outcome measures (Table 7.2). Ethnicity, level of education, unemployment duration, and kinesiophobia did not have a significant contribution. The explained variance was lowest for flexibility ( $R^2 = 7.4\%$ ) and highest for  $VO_2\text{max}$  ( $R^2 = 31.8\%$ ). Half of the subjects were not able to finish the Åstrand Ergometer Bicycle test and failure was associated with older age, lower self esteem and lower physical functioning.



**Table 7.1** Characteristics of unemployed persons with health complaints (n = 252) who enrolled in a health promotion programme

Variable	
Demographic characteristics	
Men	46.4%
Age (yr)	42.11 (9.12)
Married or living with partner	35.2%
Ethnic background	
Native Dutch	24.9%
Turkish/Moroccan	25.7%
Surinamese/Antillean	29.0%
Other	20.4%
Level of education	
Low	67.9%
Intermediate	28.8%
High	3.3%
Unemployment duration (n=245)	
< 5 years	27.4%
> 5 years	53.5%
Never worked	19.1%
Psychological measures	
Self-esteem (1-4)	2.85 (0.56)
Mastery (1-4)	2.45 (0.55)
Kinesiophobia (1-4) (n=239)	2.68 (0.47)
Self-perceived health (SF-36)	
Physical functioning	52.69 (23.11)
Role functioning (physical)	32.18 (39.66)
Bodily pain	41.39 (23.42)
Vitality	43.74 (16.03)
Social functioning	53.64 (25.88)
Role functioning (emotional)	48.43 (44.58)
Mental health	53.00 (18.85)
General health	37.62 (18.23)
Physical measures	
BMI (kg/m <sup>2</sup> )	27.61 (5.68)
overweight (25 <= BMI < 30)	32.9%
obese (BMI >= 30)	29.4%
VO <sub>2</sub> max (ml/kg/minute) (n=130)	24.60 (7.85)
Abdominal muscle strength (sit-ups/minute) (n=216)	21.13 (13.69)
Flexibility (cm) (n=223)	23.70 (10.94)
Systolic blood pressure (mmHg)	130.33 (17.42)
Diastolic blood pressure (mmHg)	82.96 (10.89)

**Table 7.2** Determinants of physical health† at baseline among unemployed persons who enrolled in a health promotion programme (n=252) based on multivariate linear regression analyses

	BMI	VO2max (n = 130)	Abdominal muscle strength	Flexibility	Systolic blood pressure	Diastolic blood pressure
Constant	26.26	41.08	14.13	17.97	97.66	67.04
Female	2.51**	-3.91**	-4.50**	4.04**	-4.03	-0.51
Age (yr)	0.05	-0.36**	-0.22**	-0.09	0.52**	0.19**
Married or living with partner	2.08**	-1.04	-6.67**	-1.59	1.66	-0.28
Self-esteem (1-4)	0.71	-1.49	0.20	0.64	3.85*	3.79**
Physical functioning (0-100)	-0.01	0.05*	0.12**	0.08*	-0.02	-0.05
Explained variance (R <sup>2</sup> )	8.9%	31.8%	15.6%	7.4%	9.8%	8.9%

\* 0.05 ≤ P ≤ 0.10, \*\*P < 0.05.

† BMI (kg/m<sup>2</sup>), VO<sub>2</sub>max (ml/kg/minute), abdominal muscle strength (sit-ups/minute), flexibility (cm), diastolic and systolic blood pressures (mmHg).

### Changes in physical health

Participants in the programme showed significant decreases in diastolic and systolic blood pressure by 2.2%-2.5% and significant increases in cardio respiratory fitness, flexibility, and abdominal muscle strength by 6.8%-51.0% (Table 7.3). Effect sizes were small to medium (Cohen's *d* ranged from 0.17 to 0.68). In addition, the proportion of participants that was able to complete the bicycle test increased from 52% at baseline to 71% at follow-up.

**Table 7.3** Changes in physical health among unemployed persons who participated in a health promotion programme

Outcome measure	Pre-test Mean (SD)	Post-test Mean (SD)	Change (95% CI)	Effect size (Cohen's <i>d</i> )	Change (%)
BMI (n=216)	27.93 (5.76)	27.86 (5.70)	-0.03 (-0.12-0.06)	0.01	-0.1%
VO <sub>2</sub> max (n=97)	24.27 (7.77)	25.60 (8.08)	1.64** (0.53-2.76)	0.21	6.8%
Abdominal muscle strength (n=196)	21.56 (13.97)	31.24 (17.94)	10.99** (9.02-12.96)	0.68	51.0%
Flexibility (n=191)	23.83 (11.00)	25.10 (10.68)	1.99** (1.17-2.81)	0.18	8.4%
Systolic blood pressure (n=216)	130.63 (17.57)	127.23 (16.20)	-3.28** (-5.48- -1.08)	0.19	-2.5%
Diastolic blood pressure (n=216)	83.39 (10.98)	81.57 (10.79)	-1.83** (-3.40--0.26)	0.17	-2.2%

\* 0.05 ≤ P ≤ 0.10, \*\*P < 0.05, paired t-test.

## Determinants of improvement in physical health

Significant interaction terms of sex with time and baseline values of physical health and time were consistently observed. Table 7.4 shows that men improved more in VO<sub>2</sub>max, flexibility, and systolic blood pressure, whereas women improved more in abdominal muscle strength. The effect of the category 25%-75% percentile of initial physical health describes the average improvement in the study population, adjusted for age, and was close to the observed differences in table 3. For VO<sub>2</sub>max, abdominal muscle strength, and flexibility, a statistically significant trend was observed with subjects with an initially lower score on physical health improving more than subjects with a better physical health. For systolic and diastolic blood pressure a strong regression to the mean was observed with the lowest group improving and the highest group deteriorating.

**Table 7.4** Determinants of changes in physical health<sup>†</sup> among unemployed persons who participated in a health promotion programme (n=216) estimated by multivariate linear regression analyses with repeated measurements

	Change in VO <sub>2</sub> max	Change in abdominal muscle strength	Flexibility	Systolic blood pressure	Diastolic blood pressure
Baseline value					
< 25% percentile	3.37**	13.44**	3.61**	8.33**	5.22**
25%-75% percentile	2.06**	10.59**	2.00**	-3.10	-1.84
> 75% percentile	-0.85	9.31**	0.25	-13.80**	-8.06**
Sex					
Men	2.19**	10.30**	2.57**	-4.23**	-1.31
Women	1.23	11.59**	1.53**	-2.46	-2.27**

\* 0.05 ≤ P ≤ 0.10, \*\*P < 0.05, paired t-test.

<sup>†</sup>VO<sub>2</sub>max (ml/kg/minute), abdominal muscle strength (sit-ups/minute), flexibility (cm), diastolic and systolic blood pressures (mmHg).

## DISCUSSION

At the start of the programme, participants were in poor physical health, considering their low VO<sub>2</sub>max and the high prevalence of overweight and obesity. Physical health of the participants improved significantly, except for BMI. Participants' cardio respiratory fitness, abdominal muscle strength, and flexibility had increased by 6.8%-51.0%, whereas diastolic and systolic blood pressures had decreased by 2.2%-2.5%. The effect sizes range from 0.17-0.68, indicating small to moderate effects. Participants with the poorest physical health benefited most from the programme and sex differences in improvement were observed.

The participation in this health programme was 73% (n=338), which was higher than reported in other studies among low socio-economic groups [10, 14] or in the general population. [13] The high participation was partly due to the more or less compulsory nature, which may also explain the lack of any differences between participants and non-participants on demographic, psychological, or self-perceived health measures. Participants who completed the programme had a higher initial BMI than drop-outs, indicating that the subjects who needed the programme the most were also most likely to finish it.

Participants in the programme were a particularly unhealthy group. The prevalence of overweight and obesity was 33% (n=83) and 29% (n=74) respectively, as compared to 40% and 10% in the general Dutch population. [26] Cardio respiratory fitness was on average 30% lower than in healthy, untrained reference groups. [27] In addition, self-perceived health was approximately 30% lower than a random sample of inhabitants of the same city (data not shown). Although the participants' physical improvements were promising, the changes were generally modest, and considering the poor health at baseline, the programme did not succeed to improve the participants' physical health to the average value in the general Dutch population. Approximately 25% of the required improvement was reached.

Previous studies have shown similar improvements in physical health with flexibility increasing with 9% after a worksite health promotion programme [28] and a 3% decrease in systolic and diastolic blood pressure after an exercise programme among adults. [29] Slightly higher increases in maximum oxygen absorption have been reported after exercise programmes among diabetic patients (11.8%) [30] in obese women (15%) [31], and stroke patients (10%). [32] Body mass index remained unchanged in our study, which may be explained by the fact that food intake was not addressed in the programme [28]. An important consideration is whether a longer duration of the programme or more sessions a week would have resulted in larger gains in physical health. A recent review on several modalities of physical training programmes among diabetic patients showed that the influence of programme duration was limited, but a higher exercise intensity was associated with greater increase in  $VO_2\text{max}$ . [30] This may be considered as a guideline for future exercise programmes.

The improvement in physical health was predominantly associated with sex and initial value of physical health, whereas training attendance nor any of the determinants of physical health at baseline were not associated with improvements in physical health. The finding that individuals in poorest physical condition benefited most from the intervention is in accordance with previous research into decreases in blood pressure. [29, 33] For blood pressure a strong regression to the mean was observed, whereby subjects with high blood pressure decreased and subjects with low blood pressure increased. [24] Despite this regression to the mean, the improvement among

subjects with intermediate blood pressure indicates the overall improvement due to participation in the health promotion programme.

The results are promising, however, since they are in accordance with findings of similar exercise interventions, even though subjects were not voluntarily enrolled in the programme, and participants' health improved consistently on all outcome measures. An earlier study on unemployed people with low back pain [16] showed improvements in physical health as well, but may have been biased due to the self-selection of motivated subjects. Another limitation is the lack of appropriate process information on the implementation of the graded-activity principle in the physical exercises. Feedback provided by the physical education teachers indicates that getting the participants involved was a major challenge in itself and that an increase in training effort will certainly not have been achieved by all participants. This may partly explain the rather moderate gains in cardio respiratory fitness. A third weakness of this study was the choice for the bicycle test as measure of cardio respiratory fitness. At baseline, half of the participants were not able to carry out the bicycle test. The lack of biking skills among non-Dutch people may have played a role, but also among native Dutch persons a too low cardio respiratory fitness was observed to carry out the test. Persons who were not able to carry out the bicycle ergometer pre-test did not drop out of the intervention, but were allowed to participate in the intervention. However, for estimating the effect of the intervention on cardio respiratory fitness these participants were not included. At post-test some of the participants who were not able to carry out the pre-test, where indeed able to carry out the post-test. The higher proportion of participant completing this test at follow-up indicates that the improvement in  $\text{VO}_{2\text{max}}$  will have been underestimated. Furthermore, it cannot be excluded that practice effects underlie the improvements on abdominal muscle strength and flexibility.

Data collection was conducted completely independent from the intervention programme, since attending the programme was more or less mandatory whereas participation in this study was completely voluntary. As a consequence, some subjects who filled out the questionnaire did not take part in the programme, whereas other subjects took part in the programme but did not respond on the questionnaire. Therefore, the evaluation is based on less persons (46%,  $n=216$ ) than what would be expected based on the participation (73%) and drop-outs (14%).

Persons with a low educational level and/or a non-Dutch origin may have had difficulties with filling out the questionnaire due to illiteracy or difficulties with the Dutch language. To overcome these problems interviewers were used in this study. The interviewers could offer an interview in the mother tongue (Dutch, Arabic, or Turkish). However, the validity of the questionnaires may be less good for persons with a non-Dutch origin or low literacy, due to differences in interpretation of questions caused by cultural differences.

No associations between objective physical health and self-perceived health (SF-36) were found in this study. It was assumed that by improving physical health and fitness, self-perceived physical and mental health would also increase. The lack of any association between perceived health and objective physical health, as measured by cardio respiratory fitness, has been observed in several other studies. [34-35] Perceived health may be influenced by cognitions, for example the way people cope with their health problems. Although physical health and self-reported health were not measured at exactly the same day, time between both measurements at baseline had no influence on the lack of association. Due to this lack of association, it might be questioned whether focusing on physical health is the best way to achieve the much needed improvement in self-reported health in this study population with health complaints that were often mentioned as a barrier to strive at (re)employment. Nevertheless, improvement of physical health by objective measurements is beneficial for the health status.

To investigate the effect of this intervention on re-employment a substantially longer follow-up period is needed. However, we expect that the effect of the programme on re-employment will be modest due to the fact that physical functioning at the end of the programme is still below the average value in the general Dutch population.

This study addresses physical health within participants of an exercise programme. The overall results of the RCT on general health and social functioning is published elsewhere. [36] Schuring [36] found that the current health promotion programme did not show beneficial effects on perceived health, psychological measures, work values, job search activities or re-employment. This lack of positive effects of the intervention, despite of the increased physical health, may be due to the fact that physical functioning at the end of the programme is still below the average value in the general Dutch population and the duration of the intervention was quite limited with respect to secondary outcome measures such as re-employment. In addition to this, these outcome measures were investigated at least three months after the end of the program, the beneficial effects of the health programme may be faded away by that time due to a lack of follow up activities to sustain possible health benefits.

At the end of the intervention programme semi-structured interviews were undertaken with ten participants and ten trainers to obtain more qualitative insight into different aspects of the intervention that could be improved in the future. The process evaluation showed that after the end of the programme, most subjects fell back into their old lifestyle with low levels of physical activity. In order to have sustainable effects of a health promotion programme, it seems important for these participants to have continued supervision and support to be able to maintain a more physically active lifestyle.

The health situation of unemployed people may depend on social and labour market policies which vary across European countries. In the past decades in the Netherlands, health problems were often a legitimate reason for receiving unemployment benefits. These benefits are regarded sufficiently high to cover basic costs for all living expenses. Therefore, less than 10% of disabled persons have their main source of income through labour, whereas in Sweden this proportion amounts to over 50%. [37] Hence, results from studies concerning health and employment status in the Netherlands may not be easily be generalized to another European country.

## Conclusions

This study showed that (1) participation in a health promotion programme among unemployed persons was not influenced by individual characteristics, but younger persons were more likely to drop out, (2) physical health measured by cardio respiratory fitness increased on average by 7%, and (3) participants with the poorest health at baseline benefited most from the programme. Although the health programme consisting of an exercise and a cognitive component improved the health of unemployed persons, this improvement was not sufficiently enough to raise physical health to levels observed among individuals in the general population.

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# 8

## **General discussion**



## 8. GENERAL DISCUSSION

The relationship between unemployment and poor health has been well established, as demonstrated by a higher prevalence of illness and disability[1-2] and a higher mortality among unemployed persons.[3] Selection and causation may contribute to these inequalities in health among employed and unemployed persons. According to the selection hypothesis workers with a poor health may be more likely to leave the labour force. In addition, unemployed persons with a poor health may be less likely to enter the workforce. The causation hypothesis suggests that leaving the workforce may have a negative influence on health and that gaining paid employment may have a positive influence on health.

The objectives of this thesis are threefold:

1. *To study the influence of poor health on entering (b) and maintaining (a) paid employment.*
2. *To study the influence of entering paid employment on different dimensions of perceived health.*
3. *To evaluate the effectiveness of a health promotion programme among unemployed subjects with health complaints on physical and mental health and re-employment.*

### 8.1 MAIN FINDINGS

In a descriptive study among unemployed inhabitants of the city of Rotterdam the largest health inequalities between employed and unemployed persons were observed for native Dutch persons, whereas among persons with a non-Dutch origin, health inequalities between employed and unemployed persons were less pronounced. (Chapter 2)

#### 8.1.1 Health and Work

*Objective 1a: To describe the influence of poor health on maintaining paid employment.*

In this thesis a poor health was defined as less than good health. A longitudinal study with 2-year follow-up in the population aged over 50 years in 11 European Union countries (SHARE) showed that the health status of older European workers had a major influence on the likelihood of leaving the workforce. A poor health was a risk factor for the transition to unemployment, retirement or disability pension with odd ratios varying from 1.5 to 5.0. (Chapter 3)

Secondary data-analysis on five waves (1994-1998) of the European Community Household Panel (ECHP) survey on the working-age population in 11 European countries also showed that transitions from paid employment to various forms of non-employment were influenced by health. The effect of poor health on the probability of leaving the workforce was less pronounced in more distant years and was influenced by socio-economic variables. A poor health was a risk factor for becoming unemployed or retiring, especially among highly educated workers. (Chapter 4)

*Objective 1b: To describe the influence of poor health on entering paid employment.*

A prospective study among unemployed citizens of the city of Rotterdam showed that a poor perceived health reduced the probability of entering paid employment. Almost all dimensions of health at baseline had an influence on the likelihood of entering paid employment. The strongest association was found between physical functioning at baseline and re-employment. (Chapter 5)

The aforementioned analysis of five waves of the ECHP study supported the finding that a poor health had a negative influence on the likelihood of entering paid employment. The effect of poor health on the likelihood of becoming employed was influenced by socio-economic characteristics. A poor health was a risk factor for not entering paid employment among men, but had less effect among women. The effect of poor health on entering paid employment was consistently present up to four years before the actual transition took place. The health status among unemployed subjects with poor health remained rather stable over time and, hence, had a long-term effect on the probability of entering paid employment. (Chapter 4)

In most European countries, a poor health was a risk factor for leaving the workforce and staying unemployed, but large differences among countries were observed that could partly be explained by the unemployment rate at national level. In countries with a low national unemployment rate health competed with other labour market factors in the process of entering or retaining paid employment, whereas in countries with a high national unemployment rate the effect of health selection out of the workforce was relative small compared to other factors that determine labour opportunities for persons. (Chapter 4)

In conclusion, a poor health of European workers increased the likelihood of leaving the workforce due to unemployment, retirement, disability pension, or taking care of a household. The effect of poor health on the probability of leaving paid employment was less pronounced in more distant years. Unemployed subjects with a poor health at baseline were also less likely to return to paid employment. Almost all dimensions of health, but especially physical functioning, had an influence on the likelihood of entering paid employment. The effect of poor health on entering paid employment

was consistently present up to four years before the actual transition took place. In most European countries, poor health was a risk factor for leaving paid employment and staying unemployed, but large differences among countries were observed.

### 8.1.2 Work and Health

*Objective 2: To determine the influence of entering paid employment on different dimensions of perceived health.*

A prospective study among unemployed subjects receiving social security benefits, who were capable of full time employment and were referred to a re-employment centre in the City of Rotterdam, showed that 5% of the participants (47/965) found paid employment during the follow-up period of six months. Among the re-employed participants all self-reported dimensions of health increased, with estimated effect sizes varying from 0.1 to 0.7. The largest relative improvements were observed for mental health, social functioning, and role-limitations due to emotional or physical problems, whereas physical functioning showed the smallest relative improvement. All participants were referred to a training centre for a re-employment training. However, only 30% of the participants actually started with a re-employment training. This re-employment training did not have a positive effect on the chance of re-employment or on the health status of participants. (Chapter 5)

In conclusion, among re-employed persons all dimensions of health improved, with the largest improvement for mental health, within a short period of six months.

### 8.1.3 Health promotion of the unemployed

*Objective 3: To evaluate the effectiveness of a health promotion programme among unemployed subjects with health complaints on physical and mental health and re-employment.*

In a randomised controlled trial (RCT) the effectiveness of a health promotion programme among unemployed subjects (n=921) with health complaints receiving social security benefits from the city of Rotterdam was evaluated. The RCT showed that the health promotion programme had no beneficial effect on self-reported mental and physical health, self esteem, mastery, and pain-related fear of movement of unemployed persons with health complaints. In addition, values and attitudes towards paid employment, job search activities, and employment status at six months follow up were not affected by the health programme either. (Chapter 6)

The study among participants who received the intervention showed that cardio respiratory fitness increased on average by 7%. However, this improvement was not

sufficient to raise cardio respiratory fitness of participants to levels observed in the general population. (Chapter 7)

In conclusion, a randomised controlled trial showed that a health promotion programme among unemployed persons with health problems did not show beneficial effects on self-reported physical and mental health and re-employment.

## 8.2 METHODOLOGICAL LIMITATIONS

### 8.2.1 Health and Work

The SHARE study showed that the health status of older workers at baseline was associated with employment status two years later. (Chapter 3) However, this study gives no insight into the time window of the influence of a poor health on the probability to leave the workforce. The study includes only two measurements and the exact moment of the employment transition within these two measurements is unknown. Therefore, a poor health may have an immediate or delayed influence on the employment transition from employment to non-employment. Interrupted time-series with repeated measurements over longer periods can give more insight into the time-dynamics of the influence of health on the transition from employment to non-employment. The ECHP study was based on five measurements and showed that the proportion of persons with a good health decreased among those who left the workforce in the years before the employment transition. (Chapter 4) Therefore, the ECHP study corroborates the findings of the SHARE study that a poor health is a determinant of labour force exit.

The ECHP study showed that there were large variations between European countries in the association between ill health and various forms of exit from paid employment.[4] Due to small numbers, the country-specific analyses may be less reliable than the analysis based on 11 European countries. These variations may reflect differences between countries in institutional arrangements, e.g. the availability of disability benefit schemes for those with health problems. The ECHP study showed that a lower unemployment rate at national level was associated with larger effects of poor health on not entering paid employment or becoming unemployed. These structural factors at national level may also influence results within one country, such as the studies that were conducted in the City of Rotterdam, with a relatively high unemployment rate compared to other regions of the Netherlands. (Chapter 2, 5)



## 8.2.2 Work and Health

A prospective study among unemployed citizens of the City of Rotterdam showed an increase of health among those who started with paid employment within the short follow-up period. (Chapter 5) Due to the observational design of the study the results may have been influenced by selection bias. Subjects who found employment differed from those who stayed unemployed with respect to health at baseline and personal characteristics. These variables were adjusted for in the analysis, but there may have been other variables that influenced both health change and re-employment that were not included in the analysis.

The prospective study consisted of two measurements in between which the event of entering paid employment took place. Based on these findings, it seems most likely that starting with paid employment results in health improvement. However, due to the design of the study it cannot be ruled out that it is the other way around; a change in health status may increase the likelihood of finding paid employment. However, a review showed that an increase in health status of long-term unemployed is rather unlikely.[2] Interrupted time-series with repeated measurements can give more insight into the time-dependent trend of health status before entering paid employment and the influence of entering paid employment on this trend of health status.

## 8.2.3 Health promotion of the unemployed

A randomised controlled trial showed that a health promotion programme aimed at promotion of self-reported physical and mental health and re-employment among unemployed persons with health problems did not show beneficial effects. (Chapter 6)

The health programme may have had no effect on self-reported physical and mental health because of a lack of sustainability of the intervention. In the design of the study a vocational training directly after the end of the health programme was thought to be able to sustain positive effects of the intervention. However, in practice the vocational training was often delayed or did not start at all. This lack of follow-up activities can be considered as an implementation failure. The activities of the health promotion programme were not properly integrated with the activities of the employment services.

The study did not show any effect of the health promotion programme on re-employment. One explanation is that the study was underpowered. The prospective study of unemployed persons receiving social security benefits in the city of Rotterdam showed that less than 5% found paid employment within a period of six months. The probability of finding paid employment was even worse for the RCT study population, because all participants were faced with mental or physical health problems. The

follow-up period of six months (including three months participating in the health promotion programme) may have been too short to be able to find any effect of the intervention on the probability of re-employment of long-term unemployed persons with health problems.

## 8.3 NEW INSIGHTS

### 8.3.1 Health and Work

1. *Health selection out of the workforce is influenced by socioeconomic position of workers.*

Health selection out of the labour force is well documented. Considerably less attention has been directed to the ways in which health selection out of the labour force is moderated by the socioeconomic position of workers.[5]

In this thesis it was found that the effect of poor health on labour force exit was more pronounced among high- and intermediate-educated workers than among low-educated workers. The effect of poor health among high- and intermediate-educated workers became less strong in more distant years before leaving the workforce. Low-educated workers had a higher probability of becoming unemployed compared to high-educated workers. Among low-educated workers, the influence of health on the probability of becoming unemployed was relatively small, but the prevalence of becoming unemployed was much higher than among high-educated workers. The population attributable fractions of health in exit from paid employment were 4.3%, 4.0%, and 3.1% for low, intermediate, and high educated workers. Therefore, a poor health has an important influence on labour force exit among high- as well as low-educated workers.

It was also shown in this thesis that among ethnic minority groups health inequalities between employed and unemployed persons were less profound compared to the native-Dutch population. However, unemployment rates were higher among ethnic minority groups compared to the Dutch population. When the unemployment rate is high, the effect of health selection out of the workforce is relatively small compared to other factors that determine labour opportunities.[6] The proportion of persons with poor health that theoretically could be attributed to unemployment varied between 14% and 26% among different ethnic minority groups, compared to 13% for the Dutch population. This indicates that employment status is an important factor in socioeconomic health inequalities in all ethnic groups.

2. *The effect of ill health on labour force exit is influenced by labour market circumstances at national level.*

A comparative study of the relationship between unemployment and self-reported health in 23 European countries showed that the negative relationship between unemployment and health is consistent across Europe but varies by welfare state regime, suggesting that levels of social protection may have a moderating influence.[7] In this thesis it was found that the effect of health on employment status was influenced by labour market circumstances. In countries with a high national unemployment rate, the effect of health on labour force exit was less pronounced compared to countries with a low unemployment rate. In countries with a high national unemployment rate, the effect of health selection out of the workforce was relatively small compared to other factors that determined labour opportunities for workers. However, due to the high prevalence of labour force exit, the amount of workers who left the workforce due to health problems was of comparable importance in countries with a high national unemployment rate as well as in countries with a low national unemployment rate. It would be interesting to investigate whether the level of protection for workers with health problems against workforce exclusion and rehabilitation policies of different European countries contribute to the inclusion of persons with health problems in the workforce.

3. *Almost all dimensions of health, but especially physical functioning, had an influence on the likelihood of becoming employed.*

There is ample evidence to suggest that mental health influences the probability of re-employment.[8] However, there is limited evidence about the influence of other dimensions of health on the probability of re-employment.

In this thesis it was found that general health, physical functioning, bodily pain, social functioning, vitality and role-functioning due to emotional or physical problems all influenced the likelihood of re-employment. The strongest association was found between physical functioning and re-employment. (Chapter 5)

Health complaints may originate from a health condition, but the development of chronic health problems often also depends on psychosocial factors. Perceptions about the health problem and work may form a barrier to enter paid employment, e.g. beliefs that work is harmful, and that return to work will do further damage or be unsafe.[9] In addition, unemployed persons with health problems performed less job search activities and received less guidance to paid employment from the employment services.[10-11] (this thesis, unpublished results)

To increase the probability of re-employment of unemployed persons with health problems all barriers for entering paid employment should be addressed.[9] More research is needed to develop evidence based practices to get unemployed persons with health complaints back into the workforce.[12]

### 8.3.2 Work and health

4. *Among re-employed subjects mental as well as physical health improved within a short time-period of six months.*

In a review Waddel and Burton[13] concluded that re-employment leads to clear benefits in psychological health and some measures of well-being, although there is a dearth of information on physical health. A meta-analytic study of the psychological and physical well-being during unemployment also demonstrated that the bulk of research is focused on mental health outcomes, suggesting that other aspects of health need more attention.[14]

In this thesis it was found that among re-employed persons, self-reported general health, physical functioning, social functioning, vitality, mental health, bodily pain, and role-limitations due to emotional or physical problems improved within six months after entering paid employment, whereas the health status of those who continued to be unemployed remained unchanged. (Chapter 5)

Work provides a variety of features, including the opportunity for control, use of skills, interpersonal contact, and provision of economic resources, that may be responsible for the increase of well-being among the re-employed persons.[15] In the so-called Black report (2008) it is stated that work, matched to one's knowledge and skills and undertaken in a safe, healthy environment, can reverse the harmful effects of prolonged sickness absence or long term unemployment, and promote health, well-being and prosperity".[16] This thesis provides evidence that work is indeed good for health and, thus, work should be considered as an important part of health promotion programmes among unemployed persons.

### 8.3.3 Health promotion of the unemployed

5. *It is of crucial importance among unemployed persons with health problems to integrate activities to promote health with vocational training that promote re-employment.*

Efforts of the employment services to enhance re-employment appeared to be not effective for unemployed persons with health problems.(Chapter 5) The health problems have a negative influence on the probability of becoming unemployed. In addition, the

unemployment situation has a negative influence on the health problems, through inactivity, social isolation and a lack of daily routine. To break through this negative spiral, efforts need to be focused on health promotion as well as re-employment.[9] This thesis showed that it is of crucial importance to integrate activities to promote health with vocational training to promote health and re-employment of unemployed persons with health problems.

A randomized trial on the effectiveness and implementation of supported employment showed that high levels of integration of psychiatric and vocational services increased the probability of successful work outcomes of unemployed persons with severe mental illness. [17] Supported employment emphasises rapid job search on the basis of a person's preference and continuing support to employee and employer from an employment specialist working as an integral member of the mental health service. Different studies have shown that supported employment is effective in helping unemployed persons with severe mental illness to obtain competitive employment. [18-19]

## 8.4 RECOMMENDATIONS

### 8.4.1 Recommendations for practice

1. *Measures to keep workers with health complaints in the workforce should focus on high as well as low educated workers.*

A poor health status of European workers had a major influence on the likelihood of leaving the workforce. The influence of health on the probability of becoming unemployed was more pronounced among high- and intermediate-educated workers, but the prevalence of becoming unemployed was much higher among low-educated workers. (Chapter 3) Therefore, a poor health has an important influence on labour force exit among high- as well as low-educated workers. Measures to keep workers with health complaints in the workforce should focus on high- as well as low educated workers.

2. *Measures to include unemployed persons in the workforce are recommended to reduce socioeconomic inequalities in health.*

In Europe, differences in healthy life expectancy between socioeconomic groups typically amount to 10 years or more, counted from birth [20] According to many, such differences in health are unacceptable, and represent one of Europe's greatest

challenges for public health. Unemployed persons are a specific socioeconomically disadvantaged group. Among re-employed persons health improved within a short period of six months.(Chapter 5) Therefore, in the ambition to narrow the existing health gap measures to include persons in the workforce are recommended.

3. *It is recommended to integrate health promotion activities with labour market interventions.*

A poor health reduces the probability of entering paid employment. In a randomized controlled trial it was shown that a health promotion programme did not have an effect on self-reported physical and mental health and re-employment (Chapter 6). This lack of effect of the health promotion programme may be caused by a lack of integration of the health promotion activities with the activities of the employment services. It is recommended to integrated activities to promote health with activities that promote re-employment. A recent pilot in Rotterdam showed that such integrated approach is possible and most likely also effective.[22-23] Work as therapeutic intervention has been shown to be effective in supported employment projects, that integrate mental health care with labour market support. [18-19]

#### 8.4.2 Recommendations for research

1. *It is of interest to study the influence of socio-demographic and psychosocial characteristics on the effect of poor health on labour force exit.*

The longitudinal study with 5-year follow-up (ECHP) showed that the effect of poor health on the probability of leaving the workforce was influenced by sex, educational level and marital status of workers. (Chapter 4) It would be interesting to investigate whether other socio-demographic (e.g. age, ethnic background) or psychosocial characteristics (e.g. self esteem, social support) influence the association between ill health and labour force exit. It would be interesting to study why some workers with a health condition leave the workforce and others do not.

2. *It is of interest to investigate whether national regulations concerning workforce exclusion and rehabilitation of persons with health problems contribute to the inclusion of persons with health problems in the workforce.*

The aforementioned longitudinal study with 5-year follow-up on the working-age population in 11 European countries (ECHP) showed that there were large variations between European countries in the association between ill health and labour force exit,

that could partly be explained by the unemployment rate at national level.(Chapter 4) These variations may reflect differences between countries in institutional arrangements, e.g. the availability of disability benefit schemes for those with health problems. It would be interesting to investigate whether the level of protection for workers with health problems against workforce exclusion and rehabilitation policies of different European countries contribute to the inclusion of persons with health problems in the workforce.

3. *The influence of entering paid employment on different dimensions of perceived health should be corroborated*

The prospective study among unemployed citizens of the City of Rotterdam with two measurements in between which the event of entering paid employment took place showed an increase of health among those who started with paid employment within a short follow-up period of six months. (Chapter 5) It is recommended to corroborate these findings with an interrupted time-series design with repeated measurements over longer periods. This study design with multiple measurements of health before and after entering paid employment can give more insight into the time-dependent trend of health status before entering paid employment and the influence of entering paid employment on this trend of health status. A longer follow-up period is recommended to investigate whether the health improvement is sustained in the years after re-employment.

4. *It is recommended to evaluate the effectiveness of a highly integrated programme on health and re-employment among unemployed persons with health problems in a randomised controlled trial with a follow-up period of at least two years.*

A randomised controlled trial showed that a health promotion programme aimed at promotion of self-reported physical and mental health and re-employment among unemployed persons with health problems did not show beneficial effects.(Chapter 6) It is advised to integrate activities to promote health with activities that promote re-employment. Health promotion with a strong focus on increasing social- and labour force participation may be a promising integrated approach to increase health and re-employment of unemployed persons with health problems. Work as therapeutic intervention to promote health may also be a promising integrated approach to promote health and re-employment of unemployed persons with health problems. It is recommended to evaluate the effectiveness of these integrated approaches on health and re-employment among unemployed persons in a randomised controlled trial with a follow-up of at least two years.

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## Summary

The relationship between unemployment and poor health has been well established, as demonstrated by a higher prevalence of illness and disability and a higher mortality among unemployed persons. Selection and causation may contribute to the inequalities in health among employed and unemployed persons. Selection may act through two different pathways. Workers with a poor health may be more likely to leave the labour force. Unemployed persons with a poor health may be less likely to enter the workforce. Causation may also act in two different ways. Leaving the workforce may have a negative influence on health of the ex-workers. The other way around, gaining paid employment may have a positive influence on health.

The primary objectives of this thesis were (1) to study the influence of poor health on entering and maintaining paid employment, (2) to investigate the influence of entering paid employment on different dimensions of perceived health, and (3) to evaluate the effectiveness of a health promotion programme among unemployed persons with health complaints on physical and mental health and re-employment. The first objective was addressed in Chapter 3 and 4, the second objective was addressed in Chapter 5, and the third objective was addressed in Chapter 6 and 7.

The associations between health and employment may not be similar across all socio-economic groups. **Chapter 2** presents a cross-sectional study among inhabitants of the City of Rotterdam in the Netherlands, which aimed to evaluate whether health inequalities associated with unemployment were comparable across different ethnic groups. Differences in ill health between employed and unemployed persons were less profound in ethnic minority groups compared with the native Dutch population, but the prevalence of unemployment was much higher in ethnic minority groups. The proportions of persons with poor health that could be attributed to unemployment varied between 13% and 28% across ethnic groups.

### HEALTH AND WORK

In many industrialized countries the population is ageing, due to increasing life expectancy and falling birth rates. A rather paradoxical development is that, despite increases in life expectancy, the average time persons spend in paid work has decreased or been stable in most European countries. This paradox is explained by prolonged education among younger cohorts and a more important contributor is the high rate of exit from the labour market at older ages.

In **Chapter 3**, a longitudinal study with 2-year follow-up in the working population aged between 50 and 63 years in 11 European Union countries (SHARE) was

presented. This longitudinal study aimed to determine the impact of ill health on exit from paid employment in Europe among older workers. During the two-year follow-up period, 17% of employed workers quit paid employment, primarily due to early retirement. Poor self-perceived health was strongly associated with exit from paid employment due to retirement, unemployment, or disability (ORs from 1.32 to 4.37).

Consequences of ill health for the likelihood of becoming or staying unemployed may also depend on socioeconomic position of workers and labour market circumstances at national level. In **Chapter 4**, a longitudinal study with five annual waves of the European Community Household Panel (ECHP) survey is presented, which aimed to examine the effect of ill health on entering and maintaining paid employment. The effect of ill health on labour force exit strongly depended on education, sex, and family situation. In most European countries, a poor health or a chronic health problem predicted staying or becoming unemployed and the effects of health were stronger with a lower national unemployment level.

## WORK AND HEALTH

There is ample evidence to suggest that re-employment leads to clear benefits in psychological health. However, it is less clear whether re-employment also has beneficial effects on other measures of health, e.g. physical health. **Chapter 5** presents a prospective study with 6 months follow-up among unemployed subjects receiving social security benefits from the City of Rotterdam, the Netherlands. The aim of this prospective study was to investigate the effect of re-employment on different dimensions of health within a short period after entering paid employment. Among the re-employed participants all self-reported dimensions of health increased within six months, with estimated effect sizes varying from 0.1 to 0.7. The largest relative improvements were observed for mental health, social functioning, and role-limitations due to emotional or physical problems, whereas physical functioning showed the smallest relative improvement.

## HEALTH PROMOTION AMONG THE UNEMPLOYED

A poor health will act as a barrier to return to paid employment. In order to increase the possibilities for re-employment, improvement in health of unemployed persons may, therefore, be an important step. In **Chapter 6**, a randomised controlled trial (RCT) with six months follow-up among unemployed persons with health complaints is presented. The aim of this RCT was to evaluate the effectiveness of a health promotion

programme among unemployed persons with physical and mental health complaints and re-employment. The RCT showed that the health promotion programme had no beneficial effect on self-reported mental and physical health, self esteem, mastery, and pain-related fear of movement. In addition, values and attitudes towards paid employment, job search activities, and employment status at six months follow up were not influenced by the health programme either. The lack of integration of the intervention into regular vocational rehabilitation activities may have negatively affected the results of the health programme among unemployed people.

**Chapter 7** presents a longitudinal study among participants who received the intervention. The aim of this study was to evaluate changes in physical health among participants. The study showed that cardiorespiratory fitness increased on average by 7%. However, this improvement was not sufficient to raise cardiorespiratory fitness of participants to levels observed in the general population.

**Chapter 8**, the General Discussion, starts with a summary of the main results of this thesis, followed by study limitations that should be acknowledged when interpreting the results. Five specific new insights from the studies described above were discussed. Based on the research presented in this thesis the following recommendations are presented:

## RECOMMENDATIONS FOR PRACTICE

- 1) Measures to keep workers with health complaints in the workforce should focus on high as well as low educated workers.
- 2) Measures to include unemployed persons in the workforce are recommended to reduce socioeconomic inequalities in health.
- 3) It is recommended to integrate health promotion activities with labour market interventions.

## RECOMMENDATIONS FOR RESEARCH

- 1) It is of interest to study the influence of socio-demographic and psychosocial characteristics on the effect of poor health on labour force exit.
- 2) It is of interest to investigate whether national regulations concerning workforce exclusion and rehabilitation of persons with health problems contribute to the inclusion of persons with health problems in the workforce.
- 3) The influence of entering paid employment on different dimensions of perceived health should be corroborated.

- 4) It is recommended to evaluate the effectiveness of a highly integrated programme on health and re-employment among unemployed persons with health problems in a randomised controlled trial with a follow-up period of at least two years.

## Samenvatting

De relatie tussen werkloosheid en een slechte gezondheid is veelvuldig aangetoond, zoals blijkt uit een hogere prevalentie van ziekte en beperkingen en een hogere sterfte onder werklozen. Twee verschillende mechanismen, selectie en causatie, dragen bij aan de gezondheidsverschillen tussen werkende en werkloze mensen. Selectie werkt op twee verschillende manieren. Ten eerste hebben werknemers met een slechte gezondheid een grotere kans om de arbeidsmarkt te verlaten. Ten tweede hebben werklozen met een slechte gezondheid minder kansen om een betaalde baan te vinden. Causatie werkt mogelijk ook op twee verschillende manieren. Stoppen met werken heeft een negatieve invloed op de gezondheid van ex-werknemers. Daarnaast kan het verkrijgen van een betaalde baan de gezondheid positief beïnvloeden.

De belangrijkste doelstellingen van dit proefschrift zijn (1) het onderzoeken van de invloed van een slechte gezondheid op het verkrijgen en behouden van een betaalde baan, (2) het onderzoeken van de invloed van het verkrijgen van een betaalde baan op verschillende aspecten van de ervaren gezondheid, en (3) het evalueren van de effectiviteit van een gezondheidsbevorderingsprogramma op de fysieke en mentale gezondheid en werkhervatting van werklozen met gezondheidsklachten. De eerste doelstelling wordt behandeld in Hoofdstuk 3 en 4, de tweede doelstelling wordt behandeld in Hoofdstuk 5 en de derde doelstelling wordt behandeld in Hoofdstuk 6 en 7.

De samenhang tussen gezondheid en werkstatus is mogelijk niet gelijk voor verschillende sociaaleconomische groepen. **Hoofdstuk 2** beschrijft een cross-sectionele studie naar de samenhang tussen gezondheid en werkstatus bij Rotterdammers met verschillende etnische achtergronden. Gezondheidsverschillen tussen werkenden en werklozen waren minder groot bij etnische minderheden in vergelijking met autochtone Nederlanders, maar het werkloosheidspercentage was hoger onder etnische minderheden. De proportie personen met een slechte gezondheid door werkloosheid varieerde per etnische groep van 13% tot 23%.

### GEZONDHEID EN WERK

In veel geïndustrialiseerde landen veroudert de populatie, door een toename van de levensverwachting en een afname van het geboortecijfer. Een paradoxale ontwikkeling is dat, ondanks de toenemende levensverwachting, het gemiddeld aantal jaren dat iemand besteedt aan betaald werk in de afgelopen decennia is gedaald of gelijk is gebleven in de meeste Europese landen. Deze paradox wordt gedeeltelijk verklaard

doordat jongere mensen langer onderwijs volgen, maar een belangrijkere verklaring is de hoge uitval uit de arbeidsmarkt onder oudere medewerkers.

In **Hoofdstuk 3** wordt een longitudinale studie onder oudere werknemers in 11 Europese landen. Doel van deze longitudinale studie was het bepalen van de invloed van een slechte gezondheid op uitstroom uit de arbeidsmarkt in Europa onder oudere werknemers (leeftijd 50-63 jaar). Gedurende de follow-up periode van twee jaar verliet 17% van de oudere werknemers de arbeidsmarkt, voornamelijk vanwege vervroegde pensionering. Er was een sterke samenhang tussen een slechte ervaren gezondheid en uitval uit de arbeidsmarkt door pensionering, werkloosheid of arbeidsongeschiktheid (odds ratio's variërend van 1.32 tot 4.37).

Consequenties van een slechte gezondheid op de kans om werkloos te worden en te blijven is mogelijk ook afhankelijk van de sociaaleconomische positie van werknemers en de arbeidsmarktomstandigheden op nationaal niveau. In **Hoofdstuk 4** wordt een longitudinale studie met vijf jaarlijkse meetmomenten van een vragenlijstonderzoek onder Europese huishoudens (ECHP) beschreven, naar het effect van een slechte gezondheid op een betaalde baan te verkrijgen en te behouden. De invloed van een slechte gezondheid op uitstroom uit de arbeidsmarkt is afhankelijk van opleidingsniveau, geslacht en gezinssituatie. In de meeste Europese landen is een slechte gezondheid van invloed op de kans om werkloos te worden en te blijven, waarbij de invloed van gezondheid groter is in landen met een laag werkloosheidspercentage.

## WERK EN GEZONDHEID

Er is veelvuldig aangetoond dat werkhervatting een positieve invloed heeft op de mentale gezondheid. Echter, het is minder duidelijk of werkhervatting ook leidt tot verbetering van de fysieke gezondheid. In **Hoofdstuk 5** wordt een prospectief onderzoek onder werkloze Rotterdammers met een bijstandsuitkering beschreven met een follow-up periode van zes maanden. Het doel van deze prospectieve studie was het onderzoeken van de invloed van het starten met een betaalde baan op verschillende aspecten van de gezondheid binnen korte tijd na het starten met een betaalde baan. Alle aspecten van de ervaren gezondheid van mensen die gestart waren met een betaalde baan verbeterden binnen zes maanden. Het starten met een betaalde baan had relatief de grootste invloed op de mentale gezondheid, het sociale functioneren en rolbeperkingen door een emotioneel of fysiek probleem, terwijl fysiek functioneren de minste verbetering liet zien.



## GEZONDHEIDSBEVORDERING BIJ WERKLOZEN

Een slechte gezondheid vormt een belemmering voor het starten met een betaalde baan. Het verbeteren van de gezondheid van werklozen is mogelijk een belangrijk stap om de kans op het vinden van een betaalde baan te vergroten. In **Hoofdstuk 6** wordt een gerandomiseerd experiment beschreven met een follow-up periode van zes maanden onder werklozen met gezondheidsklachten. Het doel van dit experiment was het evalueren van de invloed van een gezondheidsbevorderingsprogramma op de fysieke en mentale gezondheid en kans op het starten met een betaalde baan van werklozen met gezondheidsproblemen. Uit het onderzoek bleek dat het gezondheidsbevorderingsprogramma geen invloed had op ervaren mentale en fysieke gezondheid, zelfwaardering, het omgaan met problemen en pijngerelateerde angst om te bewegen. Daarnaast had het gezondheidsprogramma ook geen invloed op persoonlijke waarden en attitudes ten aanzien van betaald werk, het zoeken naar een betaalde baan, en het daadwerkelijk starten met een betaalde baan. Het ontbreken van een goede integratie van het gezondheidsprogramma in de reguliere re-integratie activiteiten heeft mogelijk een negatief effect gehad op de effectiviteit van het gezondheidsprogramma voor werklozen.

**Hoofdstuk 7** beschrijft een longitudinaal onderzoek naar verandering van de fysieke gezondheid van deelnemers van het gezondheidsprogramma. Het onderzoek laat zien dat het fysieke uithoudingsvermogen van deelnemers van het gezondheidsprogramma gemiddeld 7% verbeterde. Echter, deze verbetering was niet voldoende om de fysieke conditie op het niveau van de algemene bevolking te krijgen.

**Hoofdstuk 8**, de algemene discussie, begint met een samenvatting van de belangrijkste resultaten van dit proefschrift, vervolgens worden beperkingen van het onderzoek beschreven die in het achterhoofd gehouden moeten worden bij het interpreteren van de resultaten. Vijf nieuwe inzichten voortkomend uit bovenstaande onderzoeken worden beschreven. Op basis van het onderzoek in dit proefschrift worden de volgende aanbevelingen gegeven:

### AANBEVELINGEN VOOR DE PRAKTIJK

1. Maatregelen om werknemers met gezondheidsklachten aan het werk te houden moeten zich richten op zowel hoger als op lager opgeleide werknemers.
2. Maatregelen gericht op het aan het werk gaan van werklozen met gezondheidsklachten kunnen bijdragen aan het verkleinen van sociaaleconomische gezondheidsverschillen.

3. Activiteiten gericht op het verbeteren van de gezondheid van werklozen zouden geïntegreerd moeten worden met werkgerelateerde interventies.

## **AANBEVELINGEN VOOR ONDERZOEK**

1. Het wordt aanbevolen om de invloed van sociaaldemografische en psychosociale kenmerken op de relatie tussen een slechte gezondheid en uitstroom uit de arbeidsmarkt te onderzoeken.
2. Het wordt aanbevolen om de invloed van nationale regelingen op het op de arbeidsmarkt krijgen en behouden van mensen met gezondheidsklachten te onderzoeken.
3. De invloed van het starten met een betaalde baan op verschillende aspecten van de ervaren gezondheid dient door andere onderzoeken bevestigd te worden.
4. Het wordt aanbevolen om de effectiviteit van een integrale aanpak van gezondheidsproblemen en re-integratie naar werk voor werklozen met gezondheidsproblemen te onderzoeken in een gerandomiseerd experiment met een follow-up periode van minstens twee jaar.

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Het project Gezond aan de Slag is ontstaan uit een uniek samenwerkingsverband tussen de GGD Rotterdam-Rijnmond, de dienst Sociale Zaken en Werkgelegenheid (SoZaWe) van de gemeente Rotterdam en het Erasmus MC. Dit project is de basis geweest voor een belangrijk deel van dit proefschrift. Vanuit de GGD waren Toon Voorham, Sven Graumans en Kees der Weduwe intensief betrokken bij het project. Vanuit de SoZaWe speelden Aat Brand en Paul van den Berg een belangrijke rol. Ik wil alle leden van het projectteam hartelijk bedanken voor hun bijdrage aan het project Gezond aan de Slag.

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## Curriculum Vitae

Merel Schuring werd geboren op 24 maart 1977 te Alphen aan den Rijn. Zij genoot haar basisonderwijs op de Alphense Montessorischool in Alphen aan den Rijn. In 1995 behaalde zij haar VWO-diploma aan het Scala College in Alphen aan den Rijn. Daarna startte zij met de studie Biologie aan de Universiteit Utrecht. In 2001 behaalde zij haar doctoraal Biologie. Vanaf april 2001 werkte zij als wetenschappelijk onderzoeker bij het Coronel Instituut voor Arbeid en Gezondheid van het AMC in Amsterdam. Vanaf november 2003 tot augustus 2008 was zij als wetenschappelijk onderzoeker verbonden aan de afdeling Maatschappelijke Gezondheidszorg van het Erasmus MC in Rotterdam en voerde het promotieonderzoek uit dat resulteerde in dit proefschrift. Gelijktijdig volgde ze de Master opleiding Public Health aan het NIHES (Netherlands Institute for Health Sciences) en behaalde in augustus 2008 haar Master of Public Health. Van augustus 2008 tot mei 2009 was zij werkzaam als statistisch onderzoeker bij het Centraal Bureau voor de Statistiek in Voorburg. Sinds 1 mei 2009 is ze opnieuw verbonden aan de afdeling Maatschappelijke Gezondheidszorg van het Erasmus MC in Rotterdam als (postdoctoraal) onderzoeker.

Merel is getrouwd met Bastiaan de Bruin en samen hebben zij drie zonen: Tobias (2005), Storm (2007) en Quinten (2009).

Merel Schuring was born on March 24, 1977, in Alphen aan den Rijn, the Netherlands. She received her primary school education at the Alphense Montessorischool in Alphen aan den Rijn. She obtained her secondary school education at the Scala College in Alphen aan den Rijn in 1995. Thereafter, she started studying at the Faculty of Biology at the University of Utrecht. In 2001 she graduated her Master of Science in Biology. She was then employed as a scientific researcher at the Coronel Institute of Occupational Health at the Academic Medical Centre in Amsterdam. From 2003 to 2008, she worked as a scientific researcher at the Department of Public Health at the Erasmus Medical Centre in Rotterdam, where she carried out the research presented in this thesis. During this time, she also enrolled in the Master of Science programme at the Netherlands Institute for Health Sciences, and obtained her Master of Public Health in August 2008. From August 2008 to May 2009, she was employed as a statistical researcher at Statistics Netherlands in Voorburg. She is currently employed as postdoctoral researcher at the Department of Public Health at the Erasmus Medical Centre in Rotterdam.

Merel is married to Bastiaan de Bruin and they have three sons: Tobias (2005), Storm (2007) and Quinten (2009).



## Publications in this thesis

Schuring M, Burdorf A, Kunst A, Voorham T, Mackenbach J. (2009). Ethnic differences in unemployment and ill health. *International Archives of Occupational and Environmental Health*, 82:1023-30.

Schuring M, Burdorf A, Voorham AJ, der Weduwe K, Mackenbach JP (2009). Effectiveness of a health promotion programme for long-term unemployed subjects with health problems: a randomized controlled trial. *Journal of Epidemiology and Community Health*, 63:893-899.

Schutgens CAE, Schuring M, Voorham AJ, Burdorf A (2009). Changes in physical health among participants in a multidisciplinary health programme for long-term unemployed persons. *BMC Public Health*, 9:197.

Schuring M, Burdorf A, Kunst AE, Mackenbach JP (2007). The effect of ill health on entering and maintaining paid employment: evidence in European countries. *Journal of Epidemiology and Community Health*, 61:597-604.

Schuring M, Mackenbach J, Voorham AJ, Burdorf A. The effect of re-employment on perceived health. *Journal of Epidemiology and Community Health*, in press.

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### OTHER PUBLICATIONS

der Weduwe K, Schuring M, Burdorf L, Voorham T (2006). Gezond aan de Slag - gezondheid bevorderen van langdurig uitkeringsgerechtigden. *Tijdschrift voor Gezondheidswetenschappen*, 6:354-357

Haafkens J, Moerman C, Schuring M, van Dijk F (2006) Searching bibliographic databases for literature on chronic disease and work participation. *Occupational Medicine (London)*, 56:39-45.

Schuring M, Sluiter JK, Frings-Dresen MHW (2004) Evaluation of top-down implementation of health regulations in the transport sector in a 5-year period. *International Archives of Occupational and Environmental Health*, 77:53-9.

Schuring M, Sluiter JK, Frings-Dresen MHW (2003) Onregelmatige werktijden: het ontstaan en herstel van vermoeidheid. *Tijdschrift voor Ergonomie*, 28:4-10.



# PhD Portfolio

## Summary of PhD training and teaching activities

Name PhD student: Merel Schuring

PhD period: November 2003 – August 2008

Erasmus MC Department: Public health

Promotors: J.P. Mackenbach, MD, PhD  
A. Burdorf, PhD

Research School: Netherlands institute for health sciences (Nihes)

	Year	Workload (ECTS)
<b>1. PhD training</b>		
<b>General academic skills &amp; Research skills</b>		
Master of Science in Public Health, Netherlands Institute for Health Sciences (Nihes), Rotterdam, The Netherlands	2004-2008	70
<b>Presentations</b>		
Schuring M, Mackenbach JP, Voorham AJ, Burdorf A. "The effect of re-employment on perceived health". Paper presented at the Department of Public Health, Erasmus MC, Rotterdam, The Netherlands	2010	1
Schuring M, Burdorf A. "Evaluatie Gezond aan de Slag". Ergo Control Congres, Woudenberg, The Netherlands	2008	1
Schuring M, Burdorf A. "Evaluatie Gezond aan de Slag- de interventie". Expertmeeting Gezond aan de Slag, Rotterdam, The Netherlands	2007	1
Schuring M, Graumans S. "Gezond aan de Slag! Gezondheid bevorderen van langdurig uitkeringsgerechtigden". Kenniscentrum Grote Steden; expertatelier SEGV, The Netherlands.	2006	1
Voorham AJ, Schuring M, Bosch R. Workshop: "Gezond aan de Slag! Gezondheid bevorderen van uitkeringsgerechtigden". Nederlands Congres Volksgezondheid, Rotterdam, The Netherlands.	2006	1
<b>2. Teaching activities</b>		
Supervising Master's thesis	2006-2007	6
Lecture (on invitation) master course Work and Organisational Psychology, Radboud University Nijmegen, The Netherlands	2010	1