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SOCIAL DIFFERENTIALS IN HEALTH-RELATED NON-EMPLOYMENT AND POVERTY

- **STUDIES ON CONSEQUENCES OF LIMITING LONGSTANDING ILLNESS, MUSCULOSKELETAL AND MENTAL DISORDERS**

Johanna Falk



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ABSTRACT

The overall aim of the thesis is to increase knowledge on social differentials in employment and income consequences among persons with chronic disease. The studies were conducted in Sweden and different policy context during the first decade of the 2000s.

In Study I, cross-sectional survey data were used to compare relative poverty among persons with limiting longstanding illness (LLSI), with and without employment, and healthy employed persons in Sweden, Denmark and the United Kingdom (UK) in 2005 and 2010. Higher rates of relative poverty and risks of relative poverty were found among non-employed persons with LLSI, and most pronounced in the UK. In Sweden relative poverty increased considerably among non-employed persons with LLSI compared to other groups over time indicating an income polarisation most pronounced among men.

In the 5-year follow-up studies, register data from Stockholm County were used to analyse employment consequences following a first time diagnosis of musculoskeletal disorders (MSDs) in 2001 (Study II) and mood and anxiety disorders in 2005 (Study III) among persons employed at baseline, and compare to the general population. Associations between sociodemographic factors and the outcome measures among persons with a disorder were analysed. In Study II, persons with MSDs had a greater drop in employment, especially women with low education. Lower education and being foreign born was associated with an increased risk of non-employment and being granted disability pension for both men and women with MSDs. In Study III, persons with mood and anxiety disorders had higher rates of losing employment compared to the general population, and women had higher rates of not being re-employed. Increased risk of losing employment was found among men with lower income and foreign born men, and among women in the lower educational groups. Low education was associated with an increased risk of not being re-employed among women.

In Study IV, register data from Stockholm County were used to compare employment and income conditions at baseline and over 4 to 5 years between persons with a first time diagnosis of non-affective psychosis in 2005/06 and the general population. Associations between sociodemographic factors, employment status and relative poverty were analysed. Persons with non-affective psychosis had adverse employment and income conditions already prior to diagnosis. Non-employment rates remained high while decreasing in the general population. Disability pension rates doubled and social assistance rates remain high, especially among women with low education and foreign born women. Non-employment was associated with an increased risk of relative poverty as well as being foreign born among women. Disability pension seemed to alleviate the adverse income consequences among persons with non-affective psychosis.

This thesis found adverse employment and income consequences for persons with chronic disease, and social differentials in these. A combination of having chronic disease with impaired work ability, low education and being foreign born may be particularly detrimental to employment chances.

SVENSK SAMMANFATTNING

Det övergripande syftet med avhandlingen är att öka kunskapen om sociala skillnader i sysselsättnings- och inkomstkonsekvenser bland personer med kroniska sjukdomar. Studierna genomfördes i Sverige och andra välfärdsstater under det första decenniet av 2000-talet.

I studie I användes tvärsnittsdata från en europeisk enkätundersökning för att jämföra förekomsten av relativ fattigdom bland personer med långvarig begränsande sjukdom (LLSI), med och utan sysselsättning, och friska personer med sysselsättning i Sverige, Danmark och Storbritannien under 2005 och 2010. Högre andel relativt fattiga och högre risk för relativ fattigdom fanns bland icke-sysselsatta personer med LLSI jämfört med andra grupper, främst i Storbritannien. I Sverige ökade den relativa fattigdomen avsevärt bland icke-sysselsatta personer med LLSI över tid och indikerade en ökad inkomstpolarisering främst bland män.

I de 5-åriga uppföljningsstudierna användes registerdata från Stockholms län för att analysera efterföljande sysselsättningskonsekvenser av en sjukdom i rörelseorganen år 2001 (studie II) respektive depressions- och ångestsjukdom år 2005 (studie III) bland personer med sysselsättning vid baslinjen och jämföra med den övriga befolkningen. Samband mellan sociodemografiska faktorer och utfallsmåtten analyserades bland personer med sjukdom. I studie II hade personer med sjukdom i rörelseorganen en större nedgång i sysselsättningen, särskilt kvinnor med låg utbildning jämfört med den övriga befolkningen. Lägre utbildning och att vara utrikesfödd ökade sannolikheten för icke-sysselsättning och att beviljas sjukersättning för både män och kvinnor med sjukdom i rörelseorganen. I studie III förlorade en större andel personer med depressions- och ångestsjukdom sin sysselsättning jämfört med den övriga befolkningen, och en högre andel bland kvinnorna återfick inte sysselsättning. Ökad sannolikhet för att förlora sysselsättning återfanns bland män med lägre inkomster och utrikesfödda män samt bland kvinnor i de lägre utbildningsgrupperna. Låg utbildning bland kvinnor ökade sannolikheten för att inte återfå sysselsättning.

I studie IV användes registerdata från Stockholms län för att jämföra sysselsättnings- och inkomstförhållanden vid baslinjen och över 4 till 5 år mellan personer med icke-affektiv psykos 2005/06 och övriga befolkningen. Samband mellan sociodemografiska faktorer, sysselsättningsstatus och relativ fattigdom analyserades. Personer med icke-affektiv psykos hade negativa sysselsättnings- och inkomstförhållanden redan året innan diagnosen gavs. Andelen icke-sysselsatta var fortsatt hög under uppföljningstiden samtidigt som den minskade i övriga befolkningen. Andelen med sjukersättning fördubblades och andelen med försörjningsstöd var fortsatt hög, särskilt bland kvinnor med låg utbildning och utrikesfödda kvinnor. Icke-sysselsättning ökade sannolikheten för relativ fattigdom liksom att vara utrikesfödda bland kvinnor. Sjukersättning tycktes lindra de negativa inkomstkonsekvenserna bland personer med icke-affektiv psykos.

Denna avhandling fann negativa sysselsättnings- och inkomstkonsekvenser för personer med kroniska sjukdomar och sociala skillnader i dessa. En kombination av att ha kronisk sjukdom med nedsatt arbetsförmåga, låg utbildningsnivå och att vara utrikesfödd kan vara särskilt negativt för sysselsättningsmöjligheterna.

LIST OF SCIENTIFIC PAPERS

- I. Falk J, Bruce D, Burström B, Thielen K, Whitehead M, Nylén L: Trends in poverty risks among people with and without limiting-longstanding illness by employment status in Sweden, Denmark, and the United Kingdom during the current economic recession – a comparative study. *BMC Public Health* 2013 13:925.
- II. Falk J, Burström B, Nylén L. Social differentials in non-employment following hospital admission for musculoskeletal disorders in Sweden, 2001-2006. *Int J Health Serv.* 2014, 44(1):155-68.
- III. Falk J, Burström B, Dalman C, Jörgensen L, Bruce D, Nylén L: Social differentials in employment consequences after a first time diagnosis of mood and anxiety disorders – a five-year follow-up study in Stockholm County. (Manuscript).
- IV. Falk J, Burström B, Dalman C, Jörgensen L, Bruce D, Nylén L: Employment and income among first time cases diagnosed with non-affective psychosis in Stockholm, Sweden – A follow-up study 2004/2005-2010. (Submitted).

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LIST OF ABBREVIATIONS

| | |
|-----------------|--|
| OECD | Organisation for Economic Co-operation and Development |
| LLSI | Limiting longstanding illness |
| MSDs | Musculoskeletal disorders |
| ILO | International Labour Organization |
| WHO | World Health Organization |
| EU-SILC | European Union Statistics on Income and Living Conditions |
| PVS | Psychiatric Care System [Psykiatriskt Vård System] |
| RTB | The Total Population Register |
| ICD | International Classification of Diseases |
| SD | Standard deviation |
| CI _s | Confidence intervals |
| OR | Odds Ratio |
| HR | Hazard ratio |
| LISA | The Longitudinal Integration Database for Health Insurance and Labour Market Studies |

1 INTRODUCTION

The large proportion of working-age people with chronic disease outside the labour market today is a major global concern (1). Employment rates among this group are lower today compared to in the 1990s (1). Musculoskeletal and mental disorders are among the leading global health problems (2, 3).

This development puts a large burden on society and also results in individual suffering due to increasing risk of social exclusion, social downward mobility and further disease. The structural changes in the labour market and working life (4) and the recurrent economic recessions are possible explanations to the impaired employment opportunities among groups with chronic disease.

Health is socially patterned and improves by higher social position e.g. higher educational level, higher income (5). Social causation of disease as well as the social *consequences* of disease are important mechanisms in the process of social inequalities in health (6). Non-employment and poverty are two examples of the social consequences of disease.

The welfare state has a fundamental purpose to reduce poverty and improve living conditions among disadvantaged groups. The Nordic countries are more successful in integrating person with chronic disease into the labour market. However, employment opportunities for this group deteriorated in Sweden during the economic recession in the 1990s, especially among groups with lower education (7) and among women (8). In addition, in the first decade of the 2000s there have been restrictive changes to the Swedish social insurance and another deep economic recession. Thus, it is important to monitor how persons with chronic disease have fared in terms of employment and income to inform policy making.

This thesis aims to increase knowledge on the social differentials in employment and income consequences among persons with chronic disease. Primarily the Swedish context between 2001 and 2010 is studied and comparative analyses between Sweden, Denmark and the United Kingdom (UK) are also made.

2 BACKGROUND

2.1 CHRONIC DISEASE – THE CONCEPT AND PREVALENCE

In public health and social medicine research, the concept *chronic disease* is often used and refers to varying degrees of poor health and disabilities. Institutions monitoring this area, such as the Organisation for Economic Co-operation and Development (OECD), the European Union and Statistics Sweden, use the term *poor health and disability*, or *disabilities*, or *limiting longstanding illness* (LLSI), when referring to chronic health problems (chronic health problems for at least six months limiting daily activities). Statistics Sweden uses LLSI in the Swedish Living Conditions Surveys (9) and long term ill (ill for more than one year) in other surveys (10).

In this thesis self-assessed LLSI and medical diagnoses ranging from musculoskeletal and mental disorders are referred to as *chronic disease*.

The prevalence of chronic disease, measured as LLSI, has changed over time. In 2007, about 14 per cent of the working age population (20-64 years) in the OECD countries and 19 per cent in Sweden reported LLSI (1). In 2012, about 24.6 per cent of the European population (16 years and over) and 15.6 per cent in Sweden reported LLSI (11). Other official figures show that about 7 per cent of the Swedish population (20-64 years) reported long term disease, corresponding to about 371 000 persons in 2014 (10). The proportion is higher among women compared to men and increases by age (10).

Musculoskeletal and mental disorders are among the leading global health problems (2, 3). Based on Swedish survey data about 15 per cent among men and 21 per cent among women report longstanding disease related to the musculoskeletal system e.g. low back pain, joint disorders (12). Figures from the Stockholm County show that about 10-12 per cent of the population per year is in contact with the in- and outpatient psychiatric care or are registered with a psychiatric diagnosis in in- and outpatient psychiatric care and primary care (13). Since the 1990s the prevalence of mental disorders has gradually increased, mainly the milder conditions (e.g. depression, anxiety disorders) whereas the proportion of schizophrenia and other non-affective disorders have been rather stable (12). The prevalence of non-affective psychosis in Stockholm County has been described by Jørgensen et al (14).

2.2 WELFARE STATE REGIMES

In studies on chronic diseases and labour market participation the arrangements of social policies and labour market policies are important because they frame the social conditions persons live under and their possibilities following disease.

The concept of the *welfare state* refers to the public arrangements of social insurance, social policies, health care and education (15). These arrangements redistribute welfare resources to all citizens by taxes on income and services and social transfers. Based on sociological theory welfare states are often categorized into *regimes* based on what roles the family, market and

state has in the welfare arrangements (16). A widely used typology are Esping-Andersen's (17) three ideal types of welfare regimes *the liberal*, the *conservative/corporatist* and *the social democratic*, where he clustered welfare states based on the organization of the welfare programs, the social stratification in society, the dependence of the family and the involvement of the private market for social services. This original typology has often been criticized for e.g. not accounting for gender, but it initiated a broad and growing research field on welfare arrangements and is still widely used (18).

According to this typology features of *the liberal regime*, where e.g. United Kingdom and USA are found, are targeted as opposed to universal social policies and benefits are means-tested and often stigmatized. Furthermore, labour market policies are less regulated. The *conservative-corporatist regime*, e.g. Germany and Italy, refers to welfare arrangements with mostly earnings-related benefits administrated by the employers and with major dependence on the family for social services. (17)

The *social democratic* regime, also called the Nordic welfare model, includes Sweden and the other Nordic countries. It is characterized by tax-financed and comprehensive social policy and insurance systems with high coverage and active labour market policies aiming to reduce poverty and improve social conditions (19). Other features are commitment to full employment, high income taxes, fairly generous benefit levels and a large public sector with subsidized health care and education. The Danish labour market policies, the so-called *Flexicurity model*, differs from the other countries in that it combines high social protection in case of unemployment with high labour market flexibility (20, 21).

2.2.1 Swedish social insurance and recent policy changes

The Swedish unemployment and sickness insurances are aimed to support income maintenance in case of unemployment or in case of reduced ability to work due to impaired health (22). In Sweden, social insurance is regulated by Swedish law. The sickness insurance is tax funded and covers persons between 16-64 years living or working in Sweden. It compensates up to 80 per cent of income for maximum one year (in July 2015) (23). Impaired work ability by at least 25 per cent following poor health or disability may entitle the individual to sickness benefit or permanent disability pension to a corresponding degree. In 2008, a maximum period (one year) for receiving sickness benefits was introduced including the so-called rehabilitation chain, aiming to improve the assessment of work ability, but also to reduce the benefit levels the longer the duration of the sickness period (24). Persons who exhaust the days of sickness benefit are no longer covered by the insurance (Swedish term: *utförsäkrad*).

The unemployment insurance consists of a flat-rate basic compensation and income maintenance insurance (25). The former is given to persons of age 20 or older who do not qualify for the income maintenance benefit. The latter is financed by the state and individual membership fees to the unemployment insurance. To qualify for the income maintenance benefit membership in an unemployment fund is required for at least one year as well as

certain duration of work experience. In 2007, differentiated membership fees were introduced based on the unemployment levels within each fund. This resulted in raised fees and a significant drop of members, and the population coverage of the unemployment insurance was reduced from 70 per cent in 2004 to 55 per cent in 2008 (26). Further, the benefits levels have gradually declined in comparison to other European welfare states (27).

The means-tested social assistance is supposed to be a transitory income support, re-assessed every month and administrated by the municipalities. Over a longer time in Sweden, the real value of the social assistance has decreased (28).

2.3 DEVELOPMENT IN THE LABOUR MARKET

The large proportion of working-age people with chronic disease outside the labour market today is a major global concern (1). Employment rates among this group are lower today compared to in the 1990s (1). In 2011, the employment rates were estimated to around 47 per cent compared to 72 per cent among those without disease in the European population (average 67 per cent) (29). The corresponding Swedish figures were 58 per cent among people reporting chronic disease and 82 per cent among those without. Employment rates are particularly low among groups with mental disorders (30).

The recent decades of structural changes in the labour markets and working life, driven partly by globalization and increasing competition, may be one crucial factor for one possible explanation to the impaired employment opportunities among groups with chronic disease (4). Trends such as lean organizations, deindustrialization, more temporary employments and increasing demands on the labour force regarding both working capacity and high skilled qualifications all contribute (4). In addition, the recurrent economic recessions have caused high unemployment rates in most European welfare states (31).

During the Swedish economic recession in the 1990s downsizing and increasing unemployment rates were seen, along with deteriorated employment protection (7). This had negative effects on employment rates among groups with chronic disease and led to longer sick leaves followed by increasing rates of newly granted disability pension from the beginning of the 2000s (32). Disability pension rates continued to increase until 2005, generally more among women than among men (33). Around one-half million people were granted disability pension in 2006 (34).

In the beginning of the 2000s musculoskeletal disorders were the main diagnostic group for disability pension. However, there has been a gradual increase of the proportion of mental disorders. In accordance, a corresponding development has been seen in the granting of disability pension. From 2005 onwards mental disorders accounts for the majority of newly granted disability pensions in Sweden, particularly among the younger age groups (35).

2.4 ADVERSE EMPLOYMENT AND INCOME CONSEQUENCES

A wide range of measures of adverse employment consequences following disease are used in the literature. In this thesis the main measures are non-employment and relative poverty. Furthermore, occurrence of unemployment benefits as well as disability pension and means-tested social assistance are used as these measures indicate impaired work ability and poor economic situation.

2.4.1 Non-employment

According to the ILO:s (International Labour Organization) international standards of employment, a person who is registered with paid employment one hour per week or more is defined as employed and economically active (36). Persons without employment, so-called non-employed, are considered economically inactive. This category includes active job seekers (unemployed), and inactive groups such as persons with poor physical or mental health incapable to work, and discouraged workers who have given up searching for job. However, the labour force includes employed and job seekers but not the inactive groups (figure 1) (36). ILO:s definition of employment is used internationally by the Eurostat and the European Commission, as well as in the Swedish Labour Force Surveys (LFS) by Statistics Sweden. In this thesis, non-employment is defined as being out of paid employment according to this definition.

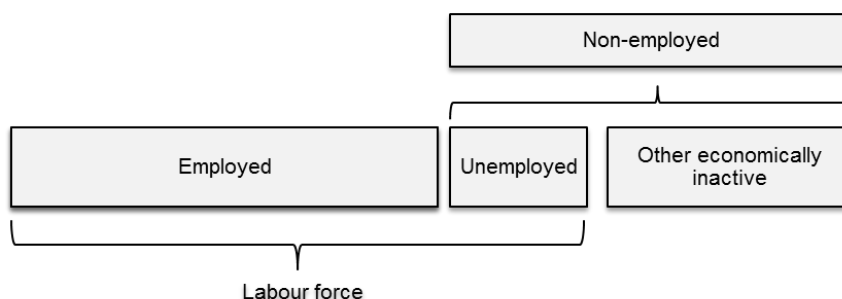


Figure 1. Definition of employment according to ILO and used in this thesis.

2.4.2 Poverty and income

Income is both a measure of the individual's social position and an outcome in this thesis. In relation to health lower income is linked to disease and shorter life expectancy (37, 38).

The concept of poverty refers to living conditions regarding standard of living and the lack of economic resources (39). Poverty impairs living conditions in several aspects e.g. material, social and psychological as described by Shawn et al (40) and constraint the individual from participating in society. This is often referred to as a process or situation of social exclusion (41). Poverty can be described as a contributing factor to social exclusion (42) and public

institutions such as the European Union and the OECD use income poverty as an indicator of social exclusion (43). These two concepts are overlapping but in contrast to poverty social exclusion is more dynamic and without any fixed threshold (44).

Poverty can be either absolute or relative. Absolute poverty is usually set to an absolute level or cut-off point, whereas relative poverty is related to a median income, commonly less than 60 per cent of the national median equalised disposable income (45). According to Townsend, the relative measure of poverty captures the individuals' resources and ability to participate in society in which they live relative to others (46). Furthermore, studies show that relatively lower income is associated with poorer health (47) and mortality (48).

The importance of paid employment as a factor for poverty prevention has increased since the mid-1990s (49). Moreover, the importance of preventing poverty resulting from unemployment has been emphasized as unemployment is part of the process of social exclusion (42). Gallie et al states: "Unemployment increases the risks of poverty and poverty in turn makes it more difficult for people to return to work" (42).

Across the European countries the average relative poverty rate was about 16.9 per cent in 2011(45).

2.5 THEORETICAL FRAMEWORKS

The social determinants of health are crucial when studying the causes of inequalities in health among both individuals and populations (5). According to the World Health Organisation (WHO), the social determinants of health are defined as: *the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life* (50). Health is socially patterned and improves by higher social position e.g. higher educational level, non-manual skilled work, and higher income, often referred to as the social gradient in health. Conversely, disease incidence and prevalence of poor health and disability is higher among persons in lower social position (5).

Dahlgren and Whitehead introduced the first model of the main determinants of health (51), and described the determinants (factors) as series of layers: general socioeconomic, cultural and environmental conditions e.g. education and unemployment, social and community networks, individual lifestyle factors and at the centre age and sex. Further, the model suggests interactions between the factors, and possibilities to modify their influence on health by implementing policies. The model is based on strong empirical evidence on morbidity and mortality.

2.5.1 Social causation of disease

Social factors may cause disease and lead to social inequalities in health. However, disease may have adverse social and economic consequences, which also may contribute to social inequalities in health. Although this thesis does not study risk factors for disease occurrence it is of great importance to consider *the social causation of disease* when studying the social

consequences of disease. For example, there is a higher risk of: LLSI in the lower income groups (52); musculoskeletal disorders by increasing age (53); mood and anxiety disorders among women compared to men (54, 55); non-affective psychosis among foreign born persons compared to Swedish born persons (56).

2.5.2 Health selection into and out from the labour market

Employment is a main determinant of health. Employed people are generally more healthy (50), and being employed seems to be beneficial for at least mental health (57). However, the association between employment and health is complex. There is a health-related selection both into and out from the labour market (58). Firstly, the *healthy worker effect* is a crucial mechanism in this process, showing that persons with good health are selected into employment and remain employed (59). Secondly, persons with poor health, on the other hand, are at higher risk of losing employment, and not being re-employed, the so-called *direct health selection (social consequence of disease)* (60). Thirdly, long-term unemployment is in itself associated with poorer health, both mental and physical (*causation/exposure*) (58, 61). The latter may either be due to increasing negative health behaviours e.g. high alcohol consumption (62) or mediated through the health consequences of poverty (63) following unemployment (*mediating factors*).

2.5.3 Policy entry points

Diderichsen et al describe the process of social inequalities in health as a chain of causal mechanisms (I-V) to better understand the social inequalities in health (Figure 2) (6, 64). All mechanisms are influenced by the individual's social position (educational level, occupation and income). Further, this theoretical framework highlights potential *policy* entry points (A-D) to improve health outcomes connected to the social and policy context.

The initial mechanism describes the *social determinants of health*, how e.g. heredity, sex, education are linked to unequal power and resources between individuals, resulting in *social stratification*. The social and policy context may partly compensate for this (policy entry point A), for example by providing equal access to the educational system, as higher educational level is associated with better health. Further, the individual's social position may be associated with *differential exposure* to risk factors for disease e.g. working conditions, health behaviours (mechanism II), and also by *differentials in vulnerability* (mechanism III), possibly due to the accumulation of several risk factors during the life course and/or interaction between them. For example people in unskilled manual jobs are more exposed to physical and psychosocial risk factors, such as low control, than those in non-manual jobs and the prevalence of smoking are higher in lower educational groups compared to the higher educated. Policies related to these two mechanisms may be laws and regulations to improve conditions in working life or increase the price of tobacco and alcohol (policy entry point B and C).

Further, the framework includes *differentials in the consequences of disease*, as a causal mechanism (IV) in the process of health inequalities. This mechanism is less studied

compared to the causes of disease, but is highly relevant in terms of labour market participation and income, and the main focus of this thesis. A wide range of social policies e.g. access to health care, the income maintenance system and labour market policy are related to this mechanism. Unequal consequences of disease may be due to that disadvantaged social groups have higher risk of losing employment when their ability to work is impaired by poor health. Also, differentials in qualifying for social insurance benefits or differentials in access to private health and income insurances may result in unequal income consequences (65). Furthermore, the adverse social consequences of disease e.g. poor employment and income conditions may be a cause of further disease or downward social mobility (mechanism V) (6). Considering the large proportion of working-age people with chronic disease outside the labour market, especially groups with severe mental diseases, this is a major public health issue. The policy entry point D *preventing unequal consequences* may be legislation to protect the individual's employment in case of disease, medical treatment and rehabilitation and policies to promote return to work and secure income support.

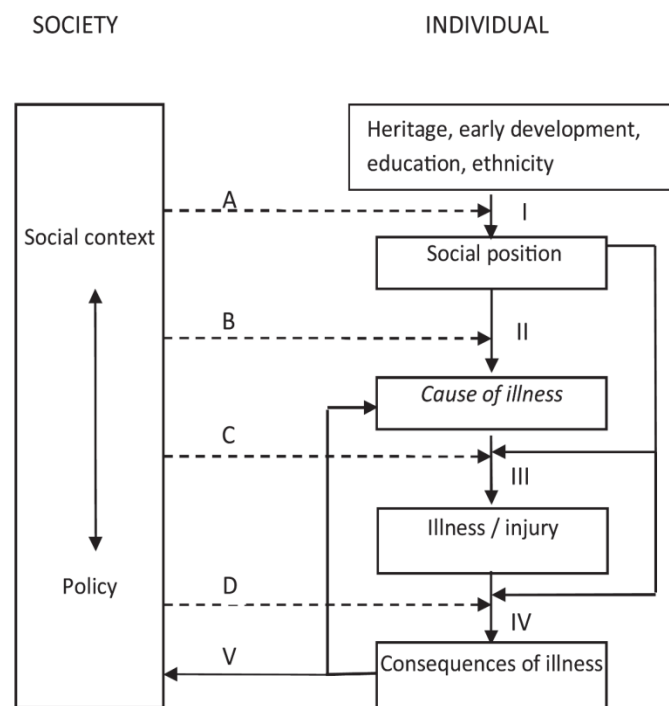


Figure 2 Framework of the mechanisms and policy entry points of the social inequalities in health by Diderichsen et al (6, 64).

2.6 PREVIOUS RESEARCH ON EMPLOYMENT AND INCOME CONSEQUENCES

Research within a range of disciplines e.g. public health sciences, social medicine and health economics show adverse employment consequences following conditions such as ischemic heart disease (66) stroke and myocardial infarction (67), breast and colorectal cancer (68, 69), diabetes (70) and multiple sclerosis (67, 71). Further, type 1 diabetes onset in childhood appears to have detrimental effect on employment (72) and earnings (73) in later adulthood.

Results indicate social differentials in employment consequences following different diseases to the detriment of those in lower social positions (66, 68, 74). However, only small negative income consequences following breast and colorectal cancer have been found (67, 69, 75), and only little evidence on adverse effect on employment status later in life among persons with childhood asthma (76).

A previous Swedish study based on survey data from the 1980s and 1990s shows negative impact on both employment and income following LLSI (77). Other Swedish studies on inpatient data from the 1990s to the beginning of the 2000s find musculoskeletal disorders to be associated with higher risk of leaving employment (78), and receiving social assistance compared to healthy controls (79). Moreover, findings indicate even more adverse employment and income consequences following mental disorders (71, 80) and particularly following psychosis and schizophrenia (67, 74, 77, 81).

2.6.1 Studies on social differentials in employment and income consequences

Swedish studies on data from the late 1990s report women and unskilled workers to be more susceptible to leave employment following musculoskeletal disorders (78) or to get financial difficulties following LLSI (77). Also, findings on educational differentials in leaving employment show that the higher risk among person with lower education is partly explained by poor general health (82). In addition, LLSI in younger adulthood may have adverse employment consequences later in life, and primarily among those with lower educational qualifications (83).

From 2000 onwards an increasing number of studies have focused on social risk factors for being granted disability pension. In several studies being a women (84-86) or having shorter education (86) is associated with an increased risk of disability pension due to musculoskeletal disorders. Findings on disability pension following mental disorders are more diverse. Studies show both an increased risk for women (87-89) and for men (90, 91), as well as for persons with lower education (89, 92) and higher education (88).

Furthermore, women with low education have an increased risk of not being in employment following hospital admission for psychosis compared to men with low education (67).

Only few longitudinal studies have investigated differentials by country of birth in the consequences following musculoskeletal or mental disorders. Not being Swedish born is

associated with higher risk of disability pension in general (93, 94), following musculoskeletal disorders (85) and following depression (89). Findings from a prevalence study show general weak labour market attachment and low income among persons with schizophrenia living in Sweden (56) and an even more vulnerable situation among foreign born persons compared to Swedish born.

Several other factors, such as higher age (88, 92, 95, 96), living alone or being unmarried (88, 89) as well as co-morbidity (95) are associated with an increased risk of disability pension following mental disorders.

2.6.2 Studies on differentials between welfare states

Several studies in public health research investigate the impact of labour market and social policy context on employment opportunities for groups with LLSI (97-102). In general, Nordic countries with active labour market policies are found to be more successful in keeping this group in the labour market, compared to liberal welfare states which have more flexible labour market policies and less generous income maintenance systems (7, 97, 98). In addition, differentials to the healthy population in employment and income conditions are smaller in the Nordic countries (100).

Although the Nordic countries have higher female labour market participation studies show generally lower employment rates among women with LLSI compared to men (97-100). Findings indicate a better employment situation for women with LLSI in Sweden compared to Denmark and Norway (99, 100).

Across welfare states, low educational qualifications further impair employment chances among persons with LLSI, but differentials in the Nordic countries are smaller compared to other welfare states (100). However, this seems to have changed in Sweden over time (7). Employment chances for persons with LLSI in different educational groups in Sweden were similar in the late 1980s but these conditions changed during the economic recession in the 1990s (7). Employment rates decreased more for groups with LLSI, compared to healthy groups, and particularly for those with both LLSI and low education. Further, the drop in employment rates for this group never recovered as they did for those with LLSI and higher education (7).

Based on the previous literature it is relevant to continue monitoring how the group with chronic disease have fared in the labour market during the first decade of the 2000s, with a special focus on social differentials. Not least in the light of the changes of the Swedish social insurance system, other policy changes and the economic recession in the latter part of the 2000s which may further have increased these social differentials. In addition, more knowledge on the employment and income consequences following the most common diagnostic groups, musculoskeletal and mental disorders, and especially the more severe psychotic disorders, are important for policy makers.

3 AIM

The overall aim of the thesis is to increase knowledge on social differentials in employment and income consequences among persons with chronic disease.

3.1 RESEARCH QUESTIONS

- 1) How do adverse income conditions differ between employed and non-employed persons with limiting longstanding illness compared to the healthy employed population by social context and do they change over time? (Study I)
- 2) How do adverse employment consequences differ in a 5-year follow-up between persons admitted for a musculoskeletal disorder and the general population, and by sociodemographic factors? (Study II)
- 3) How do adverse employment consequences differ in a 5-year follow-up between persons diagnosed with a mood and anxiety disorder and the general population, and by sociodemographic factors? (Study III)
- 4) Among persons diagnosed with a non-affective psychosis, how do employment and income conditions differ at baseline and change in a 4- to 5-year follow-up compared to the general population, and by sociodemographic factors? (Study IV)

4 MATERIAL AND METHODS

Table 1 shows an overview of the four studies. Figure 3 shows the relationships between health status, research questions, study designs and outcomes.

Table 1. Overview of the four studies

| | Study I | Study II | Study III | Study IV |
|-----------------------------|--|--|---|--|
| Research questions | How do adverse income conditions differ between employed and non-employed persons with limiting longstanding illness compared to the healthy employed population by social context and do they change over time? | How do adverse employment consequences differ in a 5-year follow-up between persons admitted for a musculoskeletal disorder and the general population, and by sociodemographic factors? | How do adverse employment consequences differ in a 5-year follow-up between persons diagnosed with a mood and anxiety disorder and the general population, and by sociodemographic factors? | Among persons diagnosed with a non-affective psychosis, how do employment and income conditions differ at baseline and change in a 4- to 5-year follow-up compared to the general population, and by sociodemographic factors? |
| Design | Cross-sectional 2005 and 2010 | Follow-up 2001 to 2006 | Follow-up 2005 to 2010 | Follow-up 2005/06 to 2010 |
| Study population | Residents in Sweden, Denmark or the UK aged 25-64. N=17,519 (2005) N=15,152 (2010) Limiting longstanding illness n=3,644 (2005) n=2,214 (2010) | Employed persons, residents in Stockholm County, aged 25-59. N= 684, 241 Musculoskeletal disorder (M00-M99) n=1,888 | Employed persons, residents in Stockholm County, aged 25-59. N=401,969 Mood disorder (F30-F39), anxiety disorder (F40-F48) n=1,553 | Residents in Stockholm County, aged 18-44 N=530,350 Non-affective psychosis (F20-F29) n=756 |
| Data source | EU-SILC | VAL, LISA | PVS, VAL, LISA, RTB, Death register | PVS, LISA, RTB, Death register |
| Outcome | Relative poverty* | Non-employment, unemployment, disability pension, social assistance | Loss of employment, non-reemployment | Non-employment, disability pension, social assistance, relative poverty** |
| Factors included | Age, sex, years of education, | Age, sex, years of education, country of birth | Age, sex, years of education, country of birth, income | Age, sex, years of education, country of birth |
| Statistical analyses | Descriptive statistics Age-standardised rates Logistic regression | Descriptive statistics Age-standardised rates Cox regression | Descriptive statistics Age-standardised rates Cox regression Logistic regression | Descriptive statistics Age-standardised rates Logistic regression |

* Below 60 per cent of the national median income (16+ yrs)

** Below 60 per cent of the median income of the study population

4.1 DATA SOURCES

4.1.1 Survey data

European Union Statistics on Income and Living conditions

The survey European Union Statistics on Income and Living conditions (EU-SILC) comprises annual cross-sectional and longitudinal data of income, labour market position, education, social exclusion and health for all European countries, except Malta (103). It was

officially started in 2004 by the European Commission and has gradually been implemented by the countries. In Sweden, the SILC survey was gradually integrated with the national ULF survey (Survey on Swedish living conditions) between 2006 and 2008 (104). The EU-SILC survey covers persons aged 16 years and over, about 240,000 households and 500,000 individuals (105). Information was collected by telephone interviews, and in some countries, e.g. Sweden and Denmark, register data on e.g. income are included. The cross-sectional data use a four year rotational design, meaning that one fourth of the respondents are renewed each year (106). In Study I, cross-sectional data from 2005 and 2010 are used from Sweden, Denmark and the UK.

4.1.2 Register data

In Studies II, III and IV different data sets containing register data and data on health care were linked through the personal identity number.

VAL

The VAL (*choice*) databases include all publicly financed health care of residents in Stockholm County: inpatient care (from 1995-) and outpatient care (from 1997-) (107). Residential information on move to or from Stockholm County are included, as well as information on persons who died. The database is updated every month. Longitudinal data on the use of health care and residential place was used in Study II.

The Psychiatric Care System

The Psychiatric Care System (PVS) comprises information from 1997 to 2007 on psychiatric in- and outpatient health care including diagnoses. It covers five of eight psychiatric catchment areas and 75 per cent of the adult population in Stockholm County: City of Stockholm (not Östermalm), Huddinge, Botkyrka, Nacka, Värmdö, Haninge, Tyresö, Nynäshamn, Ekerö, Solna, Sundbyberg, Sollentuna, Sigtuna, Järfälla, Upplands-Bro och Upplands Väsby (108). Information on diagnosis was used for the population in Studies III and IV.

The National Patient Register

The National Patient Register is held by the National Board of Health and Welfare. The register includes all inpatient care to any psychiatric or general hospital in Sweden and has complete coverage for psychiatric care (from 1973-) and for somatic care (from 1987-). Data for inpatient care were used in Studies III and IV.

The Longitudinal Integration Database for Health Insurance and Labour Market Studies

The Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA) covers annual data on employment, education, income and social benefits of Swedish residents 16 years and older (109). The register is held by Statistics Sweden and was established in 1990. In Studies II, III and IV, sociodemographic variables and outcome variables were collected from LISA and linked to other data by the personal identity number.

The Total Population Register

Information on age, sex, marital status, country of birth and place of residence was collected from the Register of the Total population (RTB) from Statistics Sweden (109).

Cause of Death Register

Information on death dates was drawn from the Cause of Death Register held by the National Board of Health and Welfare (110).

4.2 DESIGN AND STUDY POPULATION

Study I

Study I was a repeated cross-sectional study including persons (aged 25-64) in 2005/2010 in Sweden (n=3,601/4,029), Denmark (n=3,701/3,366) and the UK (n=10,217/7,757). The study population was stratified by health and employment status into three categories: healthy employed; with LLSI and employed; with LLSI and non-employed. The category of healthy non-employed persons was excluded as the composition differed considerably between the countries.

Study II

Study II was a population-based follow-up study. The study population consisted of employed persons (aged 25-59) who were residents in Stockholm County (n=684,241) followed between 2001 and 2006. Of those, 1,888 persons were admitted to hospital and diagnosed with a musculoskeletal disorder (ICD-10¹ M00-M99) in 2001. Persons receiving disability pension in 2001 or inpatient care for musculoskeletal disorders in 1999 or 2000, and persons who died in 2001 were excluded. Those not admitted to hospital with a musculoskeletal disorder in 2001 served as a reference group, referred to as the general population.

Study III

Study III was a population-based follow-up study. The study population was followed between 2005 and 2010, and comprised persons (aged 25-59) and resident in the psychiatric care catchment area in Stockholm County (N=746,349). Only those employed with an annual income of 60,000 SEK or more per year, both in 2004 and 2005 were included (n=401,969). Students, persons on unemployment benefits, disability pension or social assistance were not included. Other exclusion criteria were migration to or from Sweden or not being resident in the psychiatric care catchment area in Stockholm County between 2000 and 2004. Of the study population 1,553 persons were registered in outpatient psychiatric care with a first diagnosis of mood disorders (ICD-10 F30-39) and anxiety disorders (ICD-10 F40-F48).

Study IV

Study IV was a population-based follow-up study and included residents (aged 18-44) in the psychiatric care catchment area in Stockholm County (108). Exclusion criteria were migration five year prior to inclusion year or death at inclusion year. Persons registered with a

¹ International Classification of Diseases, 10th revision

first diagnosis of a non-affective disorder (ICD-10 F20-F29) in 2005 or 2006 were included (n=756). This group had no earlier diagnosis registration of non-affective psychosis in inpatient care since 1973 or outpatient care since 1997. Persons not diagnosed with a non-affective disorder served as a reference group, referred to as the general population. (n=529,594).

4.3 EXPOSURES, COVARIATES AND OUTCOMES

In all four studies, different measures of chronic disease were included, and considered as exposures. Exposures, outcomes and covariates are described below. The covariates included are factors that are known to be associated with both employment status and the disease under study.

4.3.1 Limiting longstanding illness

In Study I, chronic disease was measured as LLSI, defined as having chronic health problem for at least six months which caused limitations in daily activities. This measure is considered to include both chronic and severe conditions (111) and is valid for general health surveys (112). It was self-assessed in questionnaires by the following questions: *Do you suffer from a longstanding illness/health problem? Does your illness/health problem limit your activities?* (113). If the respondent answered *yes* to both these questions the person was categorised as having LLSI.

4.3.2 Musculoskeletal and mental disorders

The diagnoses in Studies II-IV were classified according to the International Classification of Diseases, 10th revision (ICD-10) (114). In Study II, diseases in the musculoskeletal system and connective tissues (M00-M99) were identified in inpatient care registers and covered disorders and syndromes in muscles, joints and skeleton. Musculoskeletal disorders, related to injury or trauma, were not included. In Study III, mood disorders e.g. depression, bipolar disorders (F30-F39) and anxiety or stress-related disorders (F40-F48) were identified in outpatient psychiatric care. In Study IV, non-affective psychoses (F20-F29) including schizophrenia, schizotypal and delusional disorders were identified in in- and outpatient psychiatric care.

4.3.3 Sociodemographic factors

Sociodemographic factors were both used as descriptive variables, as covariates (not exposure or outcome) and as exposures. Educational level and country of birth were treated as exposure variables in the sub-analyses among persons with a diagnosis (Studies II-IV) and among the general population (Study IV). Income quartiles were treated as an exposure variable in Study III.

In Studies II-IV, all analyses were stratified by *sex*. In Study I, analyses were either adjusted for sex or stratified by sex. *Educational level* was used as an indicator of socioeconomic position in all studies and was measured as highest attained *educational level* (in years), and

categorised into three groups: low/short (≤ 9 years), intermediate/upper secondary (9-12 years) and high/higher education (> 12 years) (ref). In Study I, the International Standard Classification of Education, ISCED 97 was used (115) and in Study II-IV, the Swedish standard classification of education, SUN 2000, was used (116). The latter was changed in 2000 to correspond with the previous (116).

In Study III, *income quartiles* were calculated (lowest 1 and highest 4), based on the equalized disposable income (see definition in section 2.4.2 Income and poverty).

Country of birth was dichotomised into foreign born and Swedish born in all studies. In Study III, country of birth was further categorised into four groups/regions in the descriptive data: Swedish born (ref), other Nordic countries, rest of Europe and Russia, finally rest of the world.

Age was considered as a confounder and grouped in categories: 25-44, 45-64 (Study I); 25-34, 35-44, 45-54, 55-59 (Study II); 25-29, 30-39, 40-49, 50-59 (Study III); 18-24, 25-34, 35-44 (Study IV).

In Studies III and IV, marital status was included and measured as *married* (reference group), and *not married* (including non-married, divorced and widow/widower). In Study III, the variable having *children < 18 years living at home* was included as the reference group. Inpatient care with a psychiatric main diagnosis (F00-F99) was used in Study IV and measured as being admitted to hospital for a psychiatric diagnosis (reference group) or not. Receiving sickness benefits at baseline were used in Study IV and dichotomised into *yes* and *no* (reference group). All these variables were considered as covariates, and as confounders in the multivariate analyses.

4.3.4 Employment status

In Study I, employment status was treated as an exposure and measured as *self-defined current economic status* and categorized as employed including *employed/self-employed working full or part time*, and non-employed, including: *unemployed, student, further training, unpaid work experience, in retirement or in early retirement/given up business, permanently disabled or/and unfit to work, fulfilling domestic tasks and care responsibilities, other inactivity* (113). Persons in military service were excluded.

In Studies II-IV, employment status was the outcome measure assessed annually as registered income from paid employment according to guidelines by ILO (36) and methods used by the Swedish Labour Force Survey conducted by Statistics Sweden (109).

In Studies II-IV, measures of social benefits included unemployment benefits, disability pension and social assistance on part- or full-time. In Study II, the category others consisted of persons with social assistance, students, and persons in military service, as well as unclassified people.

4.3.5 Income and poverty

In Studies I and IV, the income measure was the equalized disposable income, individualized from family income by weighting of household size and composition, after income taxes and transfers had been accounted for (109). Relative poverty was used as the outcome measure defined as having an equalised disposable income below 60 per cent of the national median income (Study I) and an equalised disposable income below 60 per cent of the study population mean income (Study IV).

4.4 STATISTICAL ANALYSES

Descriptive statistics, frequencies and proportions, at baseline (Studies I-III) or one year prior to baseline (Study IV), were presented in all studies.

Chi-square tests were used to determine differentials in sociodemographic characteristics between the groups categorised by health and employment status (Study I), and between the persons with non-affective psychosis and the general population (Study IV). Chi-square tests were also used to determine differentials in rates of persons losing employment and not being re-employed, respectively, among those with mood and anxiety disorders and the general population (Study III).

In Study I, age-standardised rates with 95 % confidence intervals (CIs) of relative poverty were presented for persons with LLSI with or without employment among healthy employed persons in each country between 2005 and 2010. Rates of educational level were presented in a pooled sample of years 2005 and 2010. Further, employment rates were presented by health status in each country in 2005 and 2010. In Study II, age-standardised rates with 95 % CIs of employment, unemployment and disability pension were presented among persons diagnosed with MSDs and for the general population for the year after the diagnosis and at follow-up in 2006. This was conducted for all and by educational level and country of birth. In Study IV, age-standardised rates of employment, disability pension and social assistance, with 95 % CIs, were presented for persons with non-affective psychosis and the general population, one year prior to diagnosis and at follow-up in 2010. Among persons with non-affective psychosis these rates were also presented by educational level and country of birth. Furthermore, mean income (SEK, Swedish crowns) with standard deviation (SD) was calculated by employment status. Age-standardisation was made to avoid impact of possible differences in the age structure between the groups (Studies I, II and IV).

Logistic regression models were used to calculate the odds ratios (ORs) with 95 % CIs for relative poverty (Studies I and IV). In Study I, the association between LLSI, employment and the outcome measure relative poverty was analysed. ORs were adjusted for age, sex, and educational level. The sex stratified analyses were adjusted for age and educational level. In Study IV, the crude ORs for relative poverty were calculated among persons with non-affective psychosis and in the general population. Adjustments were made for employment status, age group, educational level and country of birth. In Study III, logistic regression was used to analyse the ORs for not being re-employed after losing employment. Results were

presented both as crude ORs and adjusted ORs for age group, marital status, having children living at home, sickness benefit at baseline and inpatient care with a psychiatric main diagnosis during the follow-up.

Cox regression models were used to investigate the association between: educational level/country of birth and the outcome measures non-employment/unemployment/disability pension among persons with musculoskeletal disorders (Study II); educational level/country of birth/income quintile and the outcome measure loss of employment among persons with a mood and anxiety disorder (Study III). The results were presented as hazard ratios (HRs) with 95 % CIs. Adjustments were made for age group, marital status, and having children living at home, sickness benefit at baseline and inpatient care with a psychiatric main diagnosis during the follow-up (Study III). In both studies, analyses were stratified by sex. The follow-up time was calculated in years between 2002 and 2006 (Study II) and between 2006 and 2010 (Study III). Censoring was made for those who migrated from Sweden or died during follow up. In Study III testing of the assumption of proportional hazards was done by statistical time dependent variables and graphical life tests.

All the statistical analyses were carried out using the Statistical analysis system (SAS) Version 9.2 and 9.3.

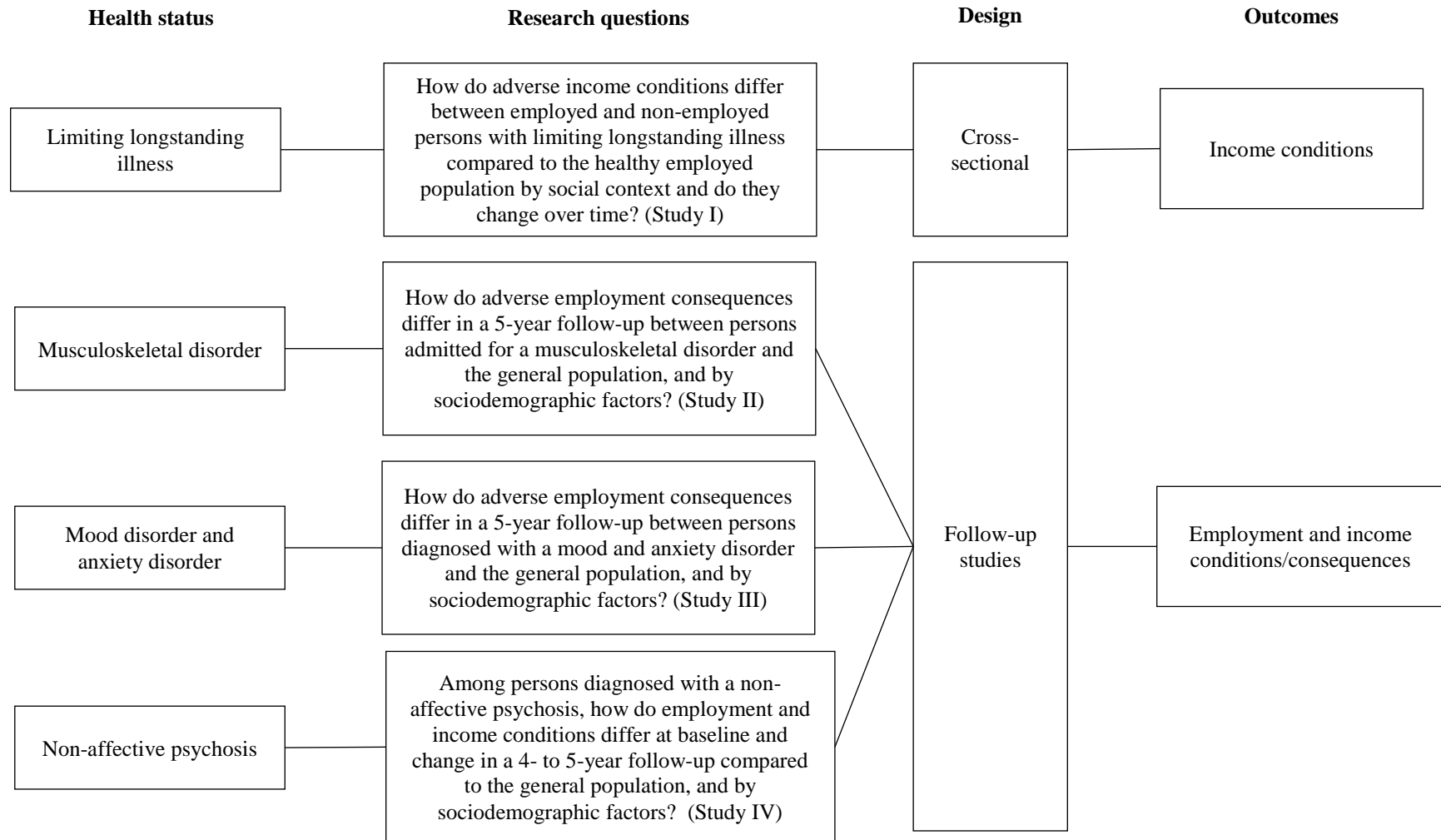


Figure 3 The relationships between health status, research questions, study designs and outcomes.

4.5 ETHICAL CONSIDERATIONS

Ethical permission for the studies has been obtained from the Regional Ethical Review Board at the Karolinska Institutet, Stockholm (Dnr 2008/1004-32; Dnr 2010/2052-31/5; Dnr 2010/1185-31/5).

In Studies II-IV, registers of health care usage and sociodemographic data were individually linked and anonymised. In Study I, the national population surveys from Sweden, Denmark and the UK were anonymised. In all studies employment and income conditions are studied among vulnerable groups. Consequently, the results are presented with respect and avoid stigmatization.

5 RESULTS

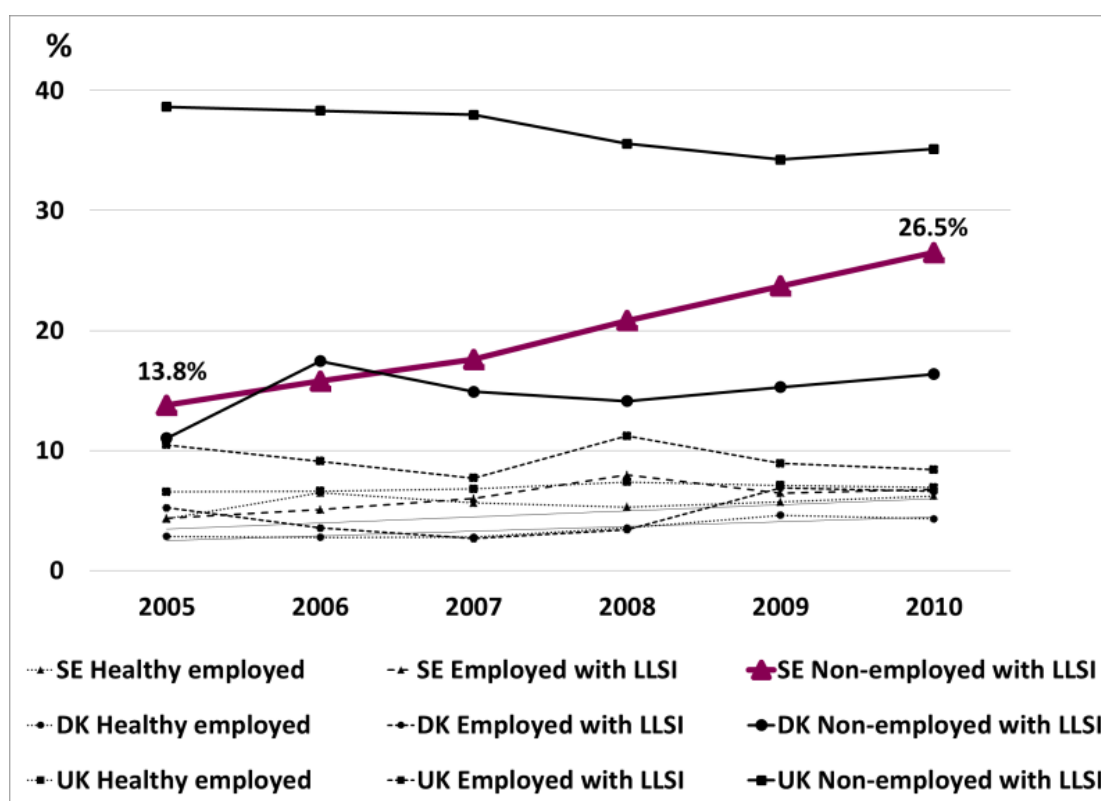
5.1 STUDY I

Research question:

How do adverse income conditions differ between employed and non-employed persons with limiting longstanding illness compared to the healthy employed population by social context and do they change over time?

Higher rates of relative poverty and risks of relative poverty were found among non-employed persons with LLSI compared to the other groups. This was found in all countries, Sweden, Denmark and the UK. However, figures were highest in the UK.

Over time, the differentials between the groups in Sweden increased considerably. In 2005 the rate of relative poverty was 13.8 per cent among non-employed persons with LLSI, compared to 26.5 per cent in 2010. A corresponding development was not found in the other two countries. Over time no statistically significant change was found in Denmark and only indications of decreasing rates in the UK over time (see Figure 4).



Figur 4 Age-standardised rates of relative poverty in Sweden (SE), Denmark (DK) and the UK among persons (aged 25-64) in three groups categorized by health and employment status, between 2005 and 2010.

5.2 STUDY II

Research question:

How do adverse employment consequences differ in a 5-year follow-up between persons admitted for a musculoskeletal disorder and the general population, and by sociodemographic factors?

Over the five year follow-up a greater drop in employment was found among persons with MSDs compared to the general population, especially for women (figure 5). Women with MSDs and low education had the greatest drop in employment, 47.7 per cent compared to 23.4 per cent among men with low education. Among foreign born men and women, employment rates declined about 30 per cent. The drop in employment was lower for corresponding groups in the general population. Age-standardised rates of disability pension were considerably higher among women with low education (26.3 per cent) compared to women in the other educational groups, and compared to men with low education (7.5 per cent).

Among both men and women admitted to hospital for MSDs in 2001, risks of non-employment and disability pension were higher among persons in the lower educational groups, and among foreign born persons. Social differentials in non-employment were also found in the general population (not published, see appendix table 1).

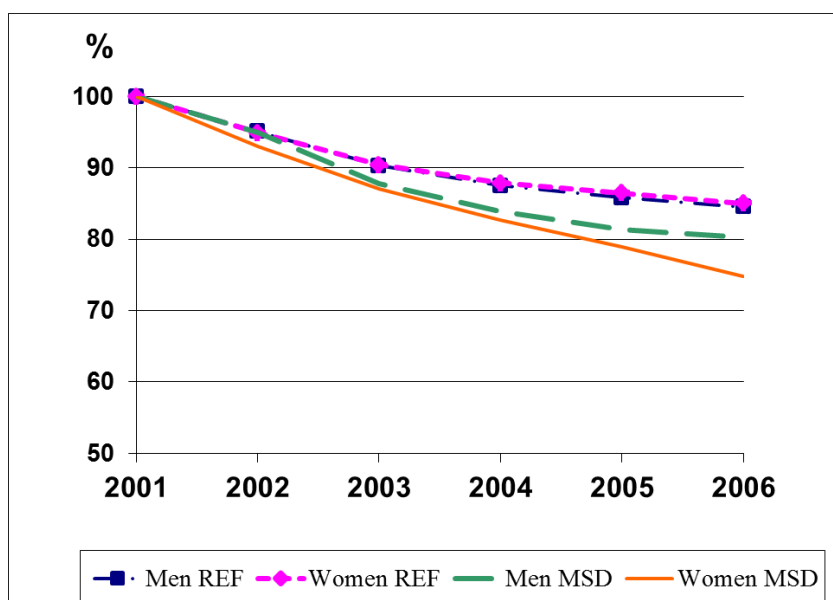


Figure 5 Age-standardised employment rates among men and women admitted to hospital for a musculoskeletal disorder (MSDs) in 2001, and the general population (REF).

5.3 STUDY III

Research question:

How do adverse employment consequences differ in a 5-year follow-up between persons diagnosed with a mood and anxiety disorder and the general population, and by sociodemographic factors?

Losing employment during the 5-year follow-up was twice as common among men (22.2 per cent) and women (23.1 per cent) with a mood and anxiety disorder, compared to the general population. Among those who lost employment between 2006 and 2009, about 46 per cent among women with a mood and anxiety disorder were not re-employed during follow-up, which was a statistically significantly higher proportion compared to among women in the general population (34.8 per cent). No significant differential was found among men.

An increased risk of losing employment was found among women in the lower educational groups (low: HR 2.7, 95 % CIs 1.7-4.2; upper secondary: HR 1.7, 95 % CIs 1.2-2.3) and among men with low income (HR 2.2, 95% CIs 1.3-3.9) and foreign born men (HR 1.81, 95 % CIs 1.2-2.7), also after adjustments for age, marital status, having children at home and inpatient care with a psychiatric main diagnosis during the follow-up. Women with low education had an increased risk of not being re-employed (HR 4.2, 95 % CIs 1.4-13.0).

5.4 STUDY IV

Research question:

Among persons diagnosed with a non-affective psychosis, how do employment and income conditions differ at baseline and change in a 4- to 5-year follow-up compared to the general population, and by sociodemographic factors?

Higher age-standardised rates of non-employment, disability pension, and social assistance were found among men and women with non-affective psychosis compared to the general population already one year prior to diagnosis. At follow-up in 2010, the high rates of non-employment remained among persons with non-affective psychosis (men 69.7 per cent; women 65.9 per cent), while decreasing in the general population (men 14.3 per cent; women 15.5 per cent). Among persons with non-affective psychosis, the highest non-employment rates in 2010 were found among persons with low education and foreign born persons.

Further, among persons with non-affective psychosis the rates of disability pension doubled at follow-up 2010, and the increase was most pronounced among women with low education. In this group, 68.7 per cent received disability pension compared to 32.2 per cent among women with higher education. In addition, the high rates of social assistance remained and were highest among women with low education (32.6 per cent) and notably higher among foreign born women (29.4 per cent) compared to Swedish born (13.8 per cent).

At follow-up 2010, age-standardised rates of relative poverty had increased considerably among non-employed persons compared to employed persons, among persons with non-affective psychosis as well as in the general population. Among persons with non-affective psychosis, rates of relative poverty were higher among persons receiving social assistance (men 68.1 per cent; women 63.5 per cent) compared to persons with disability pension (men 40.5 per cent; women 45.4 per cent).

Among persons with non-affective psychosis, the risks of relative poverty were higher for non-employed persons, for men in the lower educational groups and for foreign born women. In the fully adjusted model, the higher risks remained for non-employed persons (men OR 6.6, 95 % CIs 3.7-12.0; women OR 4.0, 95 % CIs 2.3-7.2) and for foreign born women (OR 2.3, 95 % CIs 1.3-4.0). Also, in the general population non-employment, lower education and being foreign born were associated with increased risks of relative poverty for both men and women, also after adjustments.

6 DISCUSSION

This thesis contributes to the knowledge on social differentials in employment and income consequences among persons with chronic disease and in relation to the welfare context during the first decade of the 2000s. Below the main findings from the studies in this thesis are discussed.

6.1 HEALTH, EMPLOYMENT AND POVERTY

In Study I, repeated cross-sectional results between 2005 and 2010 showed higher rates of relative poverty and risks of relative poverty among non-employed persons with LLSI compared to employed persons, with or without LLSI. Differentials between countries showed higher relative poverty risks among non-employed persons with LLSI in the UK, compared to in Sweden and Denmark. However, in Sweden this differential increased considerably between 2005 and 2010, indicating an income polarisation more pronounced among men than among women.

The findings on greater differentials between the groups in the UK were expected. These findings are in line with previous studies that show that less generous income maintenance support and flexible labour market policies in the UK do not seem to benefit groups with chronic disease (98, 100). The findings in Study I confirm that the Nordic countries are more successful in preventing poverty among groups with chronic disease. This is partly explained by generally lower poverty rates and higher employment rates compared to other countries (20, 117) and better integration of these groups into the labour market (100-102). However, regarding the income maintenance system the Nordic countries have not progressed as other European countries have done from the mid-1990s to the late 2000s (118). In addition, the Swedish development is in fact rolling back in that the levels of unemployment benefit as well as the social assistance gradually have declined (27, 28, 119). The finding of increasing relative poverty among groups with chronic disease outside the labour market in Sweden in Study I confirms this, whereas corresponding figures in Denmark did not change. Other studies show that Sweden is one of the countries where poverty and income inequality have increased the most compared to other modern welfare states (9, 120).

Another explanation to the development in Sweden is that the disposable national median income have increased during the study period, partly as a consequence of repeated cuts on income taxes from 2006 onwards. In addition, the policy change of the unemployment insurance during the study period to differentiated fees in combination with decreasing real value of both the unemployment benefit and social assistance (121) further increased the income inequalities between the non-employed groups with LLSI and healthy employed groups. Other studies confirm that these reforms seem to have benefitted those in employment, whereas unemployed persons and persons with lower education are disadvantaged (9). Study I, adds to this knowledge that the income polarisation in Sweden during the first decade of the 2000s has been more negative to groups with chronic disease outside the labour market than others and especially to men.

6.2 EMPLOYMENT CONSEQUENCES AND SOCIAL DIFFERENTIALS

Studies II and III found higher rates of non-employment (loss of employment in Study III) among persons with musculoskeletal and mood and anxiety disorders, respectively, over 5-years follow-up compared to the general population. Women with mood and anxiety disorders were less likely to be re-employed. Study I showed that among persons with a musculoskeletal disorder a greater drop in employment was found among women compared to men. The greatest employment drop was found among women with low education and they were also more likely to have disability pension. Lower educational level and being foreign born were associated with a higher risk of non-employment and disability pension. Also in the general population social differentials were found but employment rates were higher and disability rates lower compared to in the corresponding groups among persons with MSDs. Study III found that among persons with mood and anxiety disorders, low income and being foreign born among men and having lower education among women were associated with an increased risk of losing employment.

The findings of more adverse employment consequences among person with chronic disease are confirmed in other studies as well as the social pattern of the occurrence of non-employment (66, 78). Findings in Study II confirm the general situation in the Swedish labour market at the beginning of the 2000s, in that a significant proportion of persons with impaired work ability due to disease was granted disability pension (122). A study by Hetzler et al found that during the 1990s the sick leave periods gradually became longer, twice as long for women, and returning to working life after disease became less likely despite high unemployment rates (8). This was mainly found among low-skilled groups in the public sector, and especially among women. In addition, more than one third of women in low-skilled employments were granted disability pension at the beginning of the 2000s (8). Other studies confirm the higher risk of disability pension among women and persons with lower education (1, 123, 124). Hetzler et al argue that this development is not a result of the gender segregated labour market, as the length of sick leave has increased among women with disease in all working sectors. Instead, there seem to be a process of excluding unwanted groups from the labour market, particularly persons with disease, following structural changes in the working life, i.e. more demanding working conditions and weaker employment protection (8).

However, the findings of more adverse employment consequences among women compared to men in Studies II and III may still be related to the gender segregated labour market in that men and women have different working conditions (125, 126). Women are more likely to be in part-time jobs, have low income, as well as fewer career opportunities. Although employment rates among women in Sweden are higher than in most countries, women with shorter education have more insecure employments. A recent Swedish study show that time limited contracts are more common among women in low-skilled employments compared to other groups in the labour market (127). Thus, less favourable position in the labour market may increase the difficulties in keeping or re-gain employment for this group when disease

strikes. It may also cause stressful living conditions and further impair mental health for those with a mood and anxiety disorder.

Moreover, low-skilled persons may also have more physically demanding jobs and in less adjustable employments whereas persons with higher education may have more job alternatives, or possibilities to re-train (4). High physical demands in working life have also been found to increase the risk of adverse employment consequences following depression (128). In addition, women are more exposed to unpaid work, i.e. family and domestic responsibility, which increases their general work load more in comparison to men (126). Previous findings show that particularly low educated women are exposed to adverse health factors both in working life and family life (129), which further may aggravate possibilities to keep employment when disease strikes.

In Studies II and III, more adverse employment consequences were found among foreign born persons compared to Swedish born persons. This may partly be explained by generally lower level of education among foreign born compared to Swedish born (130) which may result in a weaker labour market position. Furthermore, Study III showed a higher risk of losing employment among foreign born men. Studies from the previous Swedish economic recession in the 1990s show more adverse employment consequences among persons born outside Europe compared to Swedish born (131). Employment was generally more negatively affected among foreign born men compared to foreign born women (130). During the study period of Study III, Sweden faced an economic downturn and it is likely that generally increasing unemployment rates may have been especially negative to already vulnerable groups in the labour market, e.g. foreign born persons. Another suggested explanation may be that foreign born persons are discriminated against in the labour market, not least during periods of economic recession (132).

6.2.1 Employment and income consequences of non-affective psychosis

In Study IV, rates of non-employment, disability pension and social assistance were high already one year prior to diagnosis. Over four to five years, these high non-employment rates persisted, while decreasing in the general population. Rates of disability pension doubled, and the rates of social assistance remained high. The findings of social differentials showed higher rates among groups with lower education, and foreign born persons. More specifically, the increase of disability pension was more evident among women with low education and social assistance was twice as common among foreign born women compared to Swedish born women. Among persons with non-affective psychosis, the risks of relative poverty were higher for non-employed persons, for men with lower education and for foreign born women. However, corresponding social differentials were also found in the general population, both among men and women.

The findings in Study IV indicate a generally poor employment integration of persons with non-affective psychosis over the study period. Several studies have confirmed these long-

term employment consequences (67, 79, 81). In comparison to other chronic diagnosis, this diagnostic group seems to fare worse (67, 74, 79).

One explanation to the poor employment integration could be that non-affective psychosis strikes in younger ages when not many persons have entered the labour market yet. In combination with younger age and the prodromal symptoms or untreated psychoses which are common several years before diagnosis (133, 134), educational achievements may be deteriorated. Also possibilities to work and to keep employment may be negatively affected before the diagnosis is given. Furthermore, the findings of higher non-employment among persons with low education may partly be explained by the younger ages.

Another explanation could be that non-affective psychoses are so severe that employment integration is not possible. Instead, disability pension is granted, in order to provide economic security following impaired work ability. Applying Diderichsen's model (Figure 2), this benefit is important in order to prevent social differentials in the social consequences of disease (policy entry point D). Findings in Study IV indicated that the granting of disability pension seemed to alleviate the risk of poverty among those with non-affective psychosis. Firstly, over the study period poverty rates increased for non-employed persons with non-affective psychosis but were not higher compared to rates among non-employed persons in the general population. In addition, the differentials by educational level and country of birth were less evident among those with non-affective psychosis, compared to in the general population.

However, being granted disability pension and possibly exit the labour market permanently may be problematic in several respects. In relation to Diderichsen's model, the development of exclusion from the labour market following disease may cause poor income conditions, further adversely affect health, and possibly contribute to further downward social mobility (key mechanism IV). Younger groups, as well as other groups with weak labour market attachment, i.e. persons with low education and foreign born persons may only qualify for low levels of social benefits. This may increase the risk of life long poor economic living conditions and the need for social assistance may increase, as Study IV confirmed.

Those who do not have paid employment or are granted disability pension may be in need of social assistance. Living on social assistance is problematic for several reasons. Firstly, social assistance is considered a transitory income support and is re-assessed every month. Research show that experiences of living on social assistance in Sweden includes shame, isolation and perceptions of being controlled (135). Secondly, studies on means-tested social assistance in the European countries, from the 1990s onwards, have found that this benefit has become insufficient for poverty alleviation (28, 119). Increasing levels of disposable income in the general population, and less or no increase in the benefits levels have consequently resulted in a decreasing real value of means-tested social assistance during this period. The Nordic countries are not exempted. Instead the generosity of the Swedish social assistance has dropped from a top ranking to a position below for example the UK from 1990 to 2009. Importantly, the Swedish levels of social assistance are not lifting people above the relative

poverty threshold of 60 per cent of national median income. Secondly, the initial intention of social assistance was to give economic support in acute situations for short periods, when no other alternatives existed. Today large groups, including persons with chronic disease and unemployed persons receive this support over a long period in life. These groups are instead supposed to be covered by the sickness or unemployment insurance in order to get vocational rehabilitation and other support but they do not meet the qualification criteria (136). In addition, studies show that financial strain is a common source for stress and anxiety among individuals with psychoses (137) and may impair recovery (138). This further emphasizes the importance of improving income conditions for persons with non-affective psychosis and in need of social assistance.

6.3 METHODOLOGICAL CONSIDERATIONS

This thesis monitors a major public health issue in our society today and the findings may give insight in the employment and income consequences following chronic disease through a social gradient lens. In addition, this thesis analyses updated and harmonised survey data from several European countries as well as Swedish registers data with high validity.

Studying social consequences of disease is complex and the associations are influenced by the social context i.e. social policies, labour market policies, economic development and the structure of the labour market. As described in the Background section there is social selection into disease and health selection into employment. Furthermore, there is social selection as well as health selection out from the labour market. Also, associations may go in reverse direction. Thus, many aspects have to be taken into consideration in the study design as well as in the interpretation of the findings. These issues are discussed below.

6.3.1 External validity

External validity refers to the generalizability of the findings to other study populations (59).

Findings from the national cross-sectional survey data are considered to be generalizable to the whole population of each country. Also, it could be possible to generalize the findings to other countries within the same welfare state regime, respectively. In Studies II-IV, the study populations were residents in Stockholm County. This metropolitan regional area has higher employment rates and income levels compared to the average of Sweden. Possibly, employment opportunities for vulnerable groups may be even worse in areas with higher unemployment.

6.3.2 Internal validity

Internal validity refers to how the study was performed and to the systematic errors that may bias the association that the study attempted to measure (59). The internal validity is high when the systematic errors (*biases*) are low (59). In the following section possible sources of bias (*selection bias, information bias and confounding*) and validity will be discussed in relation to the findings of the thesis.

6.3.2.1 *Selection bias*

Selection bias is a systematic error related to the selection of study participants and to factors influencing participation.

In general, groups with disease have poorer social conditions compared to the general population. Most likely this worsens the employment and income consequences following disease. In Studies II and III the social selection was limited by only including persons employed at baseline, in combination with an annual income of 60 000 SEK or more in Study III. Despite these inclusion criteria, the sociodemographic characteristics of the baseline sample indicated social selection. Among those with disease, having shorter education (Studies I and II) and having lower income (Study III) was more common compared to the general population. To further avoid social selection other methods could have been used e.g. longer wash-out periods.

However, the findings of social selection at baseline and the findings of adverse social consequences at follow-up could reflect an accumulation of social disadvantages as described in the Diderichsen's model. Both the mechanisms of differentials in disease occurrence (III) and the mechanism of differentials in the consequences of disease (IV) have to be taken into consideration when analysing social differentials in health. Thus, by excluding persons non-employed at baseline the consequences of disease were most likely underestimated as well as the social differentials. These studies probably only studied the tip of an iceberg. However, the restrictions limited the social selection and may have improved the reliability of the assessments.

No restrictions regarding previous employment status or income was made in Study I due to the cross-sectional design or in Study IV due to the large proportion of young participants in age group 18-24 years.

In Study I, other selection bias may have occurred in that healthy people in general are more likely to participate in the survey. Thus, the differentials in poverty between the groups would have been underestimated. However, each country in the EU-SILC survey uses statistical methods to compensate for underrepresented groups (106).

6.3.2.2 *Information bias*

Another systematic error is *information bias* and concerns the process of data collection and classification of exposures and outcomes. Misclassification of exposure is either differential i.e. when the exposure measure is classified differently between persons with the outcome and persons without the outcome, or non-differential if the misclassification occurs for both groups independent of the outcome. Correspondingly, misclassification of outcomes is differential if it differs between exposed and unexposed groups and non-differential if it is not related to the exposure. Differential misclassifications will either over- or underestimate the possible effect, whereas non-differential misclassification will dilute a possible association

(139). In the following section possible misclassification of disease, other exposure measures and outcomes will be discussed.

Misclassification of exposures

In Study I, LLSI was self-assessed and used as an exposure variable. This health measure is considered valid, especially for chronic and more severe disease, and usable for general health surveys (112). Also, employment status was considered as an exposure variable. In all survey data recall bias may be a possible source of bias. However, possible recall bias of information on health and employment are less likely to differ between the groups compared in Study I.

In Studies II-IV, medical first time diagnoses were defined according to the International Classification of Diseases, 10th revision ICD-10. Possible misclassification was considered to be low. In Study IV, both diagnoses registered in in- and outpatient psychiatric care were included. This method of identification improves the coverage of true cases (validity) and is necessary due to the shift from inpatient psychiatric care to outpatient psychiatric care (108).

In Studies II-IV, sociodemographic factors and employment status (Study IV) were used as exposures variables and these were obtained from national registers with high validity and coverage.

Misclassification of outcome

In Studies I and IV, the outcome measure relative poverty was based on the equalized disposable income. Possible misclassification of income may have occurred in Study I for the UK data as data was self-assessed, whereas in Sweden and in Denmark data were obtained from registers (113). However, the possible systematic bias in the UK data occurred both in 2005 and in 2010 and did probably not bias the findings of changing differentials in poverty over time.

In studies II, III and IV, register-based data were used for all outcome measures and the risk of misclassification was considered to be low. Although the measure of employment status may be crude it still indicates that the individual is in the labour market, and it also corresponds with the international definition of employment status (36). However, other complementary data for example the number of hours of paid work per week would have given a better picture.

Possible misclassification of non-employment may have occurred. In Studies I-III, persons classified as non-employed in the older age group may have taken early old-age pension. This was not accounted for. Some studies show no association between impaired health and early retirement (80, 82), whereas others do (140). Although this may have diluted the results, exit from the labour market by early retirement still may have adverse consequence, especially in groups with lower income.

6.3.2.3 *Confounding*

A confounding factor is associated with the exposure and is a risk factor for the outcome but not as a mediating factor. Confounding may occur when this factor differs between exposed and unexposed persons and becomes a problem when this is not accounted for in the analyses (139, 141). It may cause under- or overestimation of the risk.

This thesis investigated associations between: employment status and relative poverty among those with LLSI and healthy persons (Study I); sociodemographic factors (educational level, country of birth) and employment status among persons with MSDs (Study II); sociodemographic factors (educational level, country of birth, income) and employment status among persons with mood and anxiety disorders (Study III); sociodemographic factors (educational level, country of birth) and employment status and relative poverty (Study IV).

Age was treated as a potential confounder in all these analyses. In general, younger age groups may have lower educational level and lower income, especially age group 18-24 years (Study IV) and be at higher risk of non-employment compared to the other age group. Older age group may also be at higher risk of non-employment, possibly due to early retirement.

Furthermore, the analyses of associations were adjusted for other sociodemographic factors such as sex (Study I), educational level (Study I), marital status (Studies III-IV), and children living at home (Study III) as these may differ between the groups compared and may be associated with the outcome.

In addition, duration (142) and severity of the disease may be risk factors for adverse employment consequences and persons with shorter education or lower income may experience a greater severity (143). In order to account for potential confounding, the analyses in Study III were adjusted for inpatient care with a psychiatric main diagnosis during the study period. Still, confounding may have occurred as no adjustments were made for comorbidity e.g. alcohol abuse, and other somatic diagnosis, which are risk factors for adverse employment consequences (142) and may differ by educational level and country of birth. Other potential confounding factors which would have been relevant to account for are working conditions (144) as well as previous sick leave (1).

6.3.2.4 *Other sources of bias*

In the EU-SILC survey, comparability between countries is improved by harmonisation of the national questionnaires, design and implementation (145). This is ongoing and annually documented, but still country specific differentials in the survey process may occur (145).

In order to integrate the Swedish ULF survey into the EU-SILC survey, several methodological changes were made between 2006 and 2008 (104). It concerns for example the shift from face-to face interviews to telephone-based interviews and also changes in questions. According to Statistics Sweden, this has limited the comparability of data over time (104). However, although questions have been formulated differently over the years, no changes have been made in the definitions of LLSI, employment status and relative poverty

between the surveys in 2005 and 2010. Furthermore, comparative analyses of data on income and living conditions between 2005 and 2010 have been made in reports by Statistics Sweden (9).

6.3.3 Other methodological considerations

Educational level is measured in all studies. The main advantage of using this variable as a measure of socioeconomic position is that it is rather stable compared to income. Educational level is less likely to be negatively influenced by the disease or the employment status among adult persons, so-called reverse causation. However, this may be the problem with income. Consequently, loss of income due to impaired health before registration of diagnosis may bias the results. This may have been a problem in Study III where differentials by income quartiles in the employment consequences were assessed.

The measure of *country of birth* is used in the Swedish population-based registers. In two of the studies the data is categorized into foreign born and Swedish born which is crude and may create heterogeneous groups. In Study III, the measure was categorized into four groups in order to improve the descriptive baseline data of the study population.

The measure of *relative poverty* used in Studies I and IV has both advantages and disadvantages. One advantage is that it measures the relations between groups in society and is associated to both disease and mortality which are of importance in public health research. One methodological consideration in Study I is that relative poverty is related to the median national income in each country. This means that two countries with the same poverty rate may have different income levels among those in relative poverty. Moreover, in Study IV the threshold of relative poverty is based on the median income of the study population at baseline and at follow-up, respectively. This median income is lower compared to the national median income as the study population is younger (aged 18-44) in Study IV compared to the national population (16+ years) used in the national statistics. Thus, no comparisons between the rates of relative poverty in Study I and Study IV can be made. However, each poverty measure mirrors the relationship between the groups compared in each study. Lastly, the relative poverty measure can be complemented with measures of the absolute poverty to give a broader picture.

In Studies II-IV, no information on primary care and private care were included. Instead these cases may have been included in the general population. Thus, this may have diluted the differentials between the groups. However, cases registered in primary care and private care are likely to be less severe compared to those in in- and outpatient psychiatric care, which may have limited the possible dilution. Furthermore, persons with non-affective psychosis are rarely registered in primary care and private care. Thus, the problem with underestimation of the results was limited.

Study I measured associations but no conclusions on causality could be made due to the cross-sectional design.

6.4 IMPLICATIONS

In relation to the findings of the studies there are implications for policy development. Firstly, improving the integration of persons with chronic disease into the labour market, both in Sweden and in other welfare states, are important for preventing poverty and further adverse health in this group. One example could be to increase the incentives for alternative and individually adjusted employments in the private sector as well as in the public sector. Another example could be to improve the possibilities to study and retrain for persons with chronic disease, in order to increase the choices for the individual. Also, in order to re-integrate persons on disability pension into the labour market a greater focus on active efforts is needed, especially for the younger age groups and those with non-affective psychosis.

Secondly, to reduce the risk of poverty for persons with reduced work ability due to disease, improvements of the income maintenance are needed. One method could be to improve the coverage of the unemployment insurance in order to include groups with generally weak labour market attachment, i.e. younger persons, persons with low education, and foreign born persons. Another approach could be to improve the levels of unemployment benefits and social assistance so that the value of these benefits follows the development of the consumer price index.

6.5 FUTURE STUDIES

This thesis focused on social differentials in adverse employment and income consequences among persons with chronic disease. Future studies should investigate possible interaction between chronic disease and poor social conditions e.g. low education, being foreign born, and the risk of non-employment and poverty, and further compare with the corresponding risk among healthy persons with poor social conditions.

Future studies should continue to monitor the development of increasing differentials in non-employment and poverty among persons with chronic disease in comparison to the healthy population, and closely follow the policy development. Its relevance will most likely increase further in the future. Another study could apply a life course perspective to further analyse the associations between social risk factors e.g. adverse social conditions in childhood, for non-employment and poverty among persons with non-affective psychosis. Furthermore, comparative analysis between different regional areas in Sweden, i.e. urban areas and the country side, could also be interesting, as employment possibilities for vulnerable groups may vary between the areas. Another future study could investigate possible differentials in employment chances for persons with disease between the private and public working sectors, and the influence of types of employment contracts, i.e. temporary or permanent.

6.6 CONCLUSIONS

To summarise, this thesis contributes to the knowledge on social differentials in employment and income consequences among persons with chronic disease and in relation to the welfare context during the first decade of the 2000s.

Relative poverty was more common among non-employed persons with LLSI compared to employed persons, with or without LLSI. The Nordic countries were better in preventing poverty among this group compared to the UK. However, in Sweden relative poverty among non-employed persons with LLSI increased considerably between 2005 and 2010 indicating an income polarisation. This development is of concern from a health equity perspective and raises questions regarding the generosity of social benefits.

The studies on employment consequences over a 5-year follow-up showed higher rates of non-employment (loss of employment) among persons with musculoskeletal disorders (MSDs) and mood and anxiety disorders compared to the general population. Women with mood and anxiety disorders had greater difficulties to regain a job. There were social differentials in the adverse employment consequences following the disorders. Lower education, being foreign born, and having lower income were risk factors. Especially women with low education were more likely to leave the labour market following MSDs, and at higher risk to not be re-employed following mood and anxiety disorders. Improvement of labour market policies are needed to increase employment chances among these groups.

Persons with non-affective psychosis had adverse employment and income conditions already one year prior to diagnosis. Over 4- to 5-year follow-up the rates of non-employment remained high among persons with non-affective psychosis while decreasing in the general population. High and increasing rates of disability pension and social assistance were more pronounced among persons with lower education and foreign born persons especially among women. Rates of relative poverty increased the most among non-employed persons either with or without non-affective psychosis. Non-employment and being foreign born among women was associated with an increased risk of relative poverty. Social differentials in relative poverty were also found in the general population. Disability pension seemed to alleviate the adverse income consequences among persons with non-affective psychosis. More efforts are needed to improve income security and provide alternative employment opportunities for persons with non-affective psychosis.

This thesis found adverse employment and income consequences for persons with chronic disease, and social differentials in these. A combination of having chronic disease with impaired work ability, low education and being foreign born may be particularly detrimental to employment chances.

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APPENDIX

Table 1 Hazard ratios (HRs) with 95 % confidence intervals of non-employment among men and women in the general population (reference group) during five year follow-up between 2002 and 2006 by age, educational level and country of birth.

| | Men (n=337,127) | | Women (n=296,116) | |
|--------------------------|-----------------|-----------|-------------------|-----------|
| | HR | 95 % CI | HR | 95 % CI |
| Age group | | | | |
| 25-34 (ref) | 1 | | 1 | |
| 35-44 | 0.77 | 0.76-0.79 | 0.61 | 0.59-0.62 |
| 45-54 | 0.75 | 0.74-0.77 | 0.48 | 0.47-0.49 |
| 55-59 | 1.51 | 1.48-1.55 | 1.01 | 0.99-1.03 |
| Educational level | | | | |
| Long (ref) | 1 | | 1 | |
| Intermediate | 1.20 | 1.18-1.23 | 1.37 | 1.35-1.40 |
| Short | 1.45 | 1.41-1.48 | 1.77 | 1.72-1.82 |
| Country of birth | | | | |
| Swedish born (ref) | 1 | | 1 | |
| Foreign born | 2.05 | 2.01-2.09 | 1.64 | 1.61-1.67 |

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