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Institute of Family Medicine and Public Health, University of Tartu, Estonia

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CONTENTS

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III Aaviksoo E, Kiivet RA. Influence of the sickness benefit reform on sickness absence. *Health Policy*. 2016;120(9):1070–8.

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Papers I, II, and III: design of the study, preparation of datasets, data analysis, intrepretation of results, coordinationg contributions by other authors, writing the manuscripts.

ABBREVIATIONS

CI	confidence interval
EHIF	Estonian Health Insurance Fund
ESTHIS	Estonian Health Interview Survey
EU	European Union
HBEAP	Health Behaviour among Estonian Adult Population
HTP	haiguse tõttu puudumine
ILO	International Labour Organization
ISCO	International Standard Classification of Occupations
OR	odds ratio
RR	rate ratio
SA	sickness absence
SD	standard deviation

1. INTRODUCTION

Sickness absence (SA) is usually defined as absence from work in a situation when a person is unable to perform his or her professional tasks because of illness or disease. It is generally accepted that a person who participates in the active labour market has the right to grant the monetary compensation in cases of temporary incapacity of work due to illness and to stay away from work, that is, to take sick leave.

SA can be seen from two perspectives: the person's rights and obligations. The sick person is not held responsible for his or her condition and can be released form social duties, that is, from working. At the same time he or she has to consider that being sick is non-desirable and should limit sickness behaviour as much as possible (1).

On a larger scale, SA is a major factor that influences economy. The amount of lost working days, the cost of SA, and the productivity of the labour force are integral parts of economy.

Evidence suggests that in addition to the presence or absence of ill health, other individual factors may play a contributory and perhaps even a decisive role in determining who takes sick leave (2–11). Apart from the illness or the health status of an individual, the phenomenon of SA is influenced by the demographic, socio-economic, and cultural status of the population, its working environment as well as the conditions in the labour market and, last but not least, the opportunities of the social insurance system (2,7,12).

This is a big question how to design well-balanced SA policies which ensure optimal use of sick days and avoid abuse of sick days. Also, what are the most effective actions in keeping SA in desirable frames? There are many factors that must be considered. SA tends to be related to business cycles: when unemployment rises, SA falls; the more generous SA compensation policy is, the higher is SA. Whithin the population, SA varies in different age groups and socio-economic classes.

The question of redesigning SA policies rises when SA becomes intolerable, which often happens in times of economic crises. From a direct economic perspective the most important outcomes of SA are the amount of sick days and related expenditures. From a public health perspective the important outcome is the health and well-being of the working population. Changes in SA policies can influence both.

Estonia witnessed rapid economic growth from the early 2000s. In parallel to the economic growth and increase of salaries in 2003–2008 the total amount of absent days increased by 25% and the total amount paid for sickness benefits increased by 15–25% per year. SA compensation policy was revised during the recession, and after the government adopted a negative state budget, SA policy was changed. From July 1, 2009 sick-pay benefits were cut back, the waiting period was extended to the first three days of sickness; employers started to pay for sick days from day 4 to day 8, and the Estonian Health Insurance Fund

(EHIF) started the payment from the ninth day of sick leave instead of the second day previously. The result was remarkable.

This thesis deals with the question which factors influence SA in the Estonian population, and how the change in the SA compensation policy affects SA behaviour. Knowing which factors influence the decision of an individual whether to stay on sick leave or not and how much impact has the SA compensation system on the decision could help to drive SA in the desired direction.

The thesis is based on three studies: Study I identified the risk factors in SA among Estonian employees, Study II established the SA patterns for blue- and white-collar employees and analysed the influence of sick-pay cut on these populations, Study III investigated the SA patterns for men and women and different age groups and analysed the influence of the sick-pay cut on SA. In the present thesis the 'patterns of SAs' are defined as the way the SA occurs in the working population.

2. REVIEW OF THE LITERATURE

2.1. Sickness benefit: a brief history and aims

Sickness benefit provision has a longer history than health insurance, that is, compensation of, medical treatment. The 19th century witnessed many insurance schemes against the cost of sickness: fraternal order organizations, so-called friendly societies for skilled workers, farmers, clerks, and middle industrial class, mutual aid organizations for the poor and immigrant workers and labour unions. The provision of compensation was limited to the members of those organizations or to employees of certain companies, and there was inner regulation of monitoring the claims. Compulsory sickness insurance as a governmental programme became in law in Germany in 1883. From the early 20th century many European countries followed Bismarck's initiative and legislated sickness funds (13).

Nowadays employee protection in the case of sickness is a part of social security and is a human right. The minimum standards for the social security of people were set in the 1952 ILO Convention 102 (14) and adopted by the EU countries based on the Council of Europe European Code of Social Security 1964 (15). Sickness benefit as a social security item aims to secure employees against loss of income in case of illness.

2.2. Sickness insurance systems

Most countries in the world provide paid sick leave, though, on very different bases: wage replacement varies from specified agreements to fixed 100%; length of paid sick leave varies from less than 7 days to two years; coverage varies from certain employee groups to the entire employment force (16).
All European Union countries, Norway, and Iceland provide sickness benefits to employees in case of their illness while the components of benefit provision differ by countries and regions.

The sick-pay allowance could depend on length of tenure and type of agreements: whether the employee is self-employed, a public or a private-sector employee, covered with a collective bargaining agreement or not, having some specific employment contract, full- or part-time worker, and many other conditions (17).

Sickness compensation is mostly paid by national social security institutions (17). Some countries have additional insurance funds nominated by agreements. Only in the Netherlands all the sickness compensation is paid by employers.

Data comparability across countries is limited due to differences in registering and reporting SA data, as well as inter-country and intra-country differences in the coverage of the working population with sickness insurance.

Waiting period

Waiting period is a period at the beginning of sick leave, which is not compensated to the employee. In most European countries the waiting period is 1–3 days, except Iceland which has 14 days. The exception is an occupational illness or some other very specific case without any waiting days. Some countries have different waiting periods depending on the frequency of the illness. In Italy, the usual waiting period is three days, but in cases of relapses of the illness, the waiting period is 0. Some countries have no waiting days at all: the Netherlands, Poland, Belgium, Bulgaria, Norway, Denmark, and Finland (18).

Compensation rate

Wage replacement is mostly above 70% of the salary. Some countries use fixed sick-leave compensation rates (with minor exceptions). These are the Netherlands (100%), Sweden (80%), Slovenia (80%), Poland (80%), Latvia (80%), Bulgaria (80%), Romania (75%), and Estonia (70%). In Croatia and Slovakia the fixed sickness benefit provided by insurance is 70% and 55%, accordingly but may differ in collective agreements. In Cyprus and Greece the compensation rate is influenced by the number of dependants – in Cyprus the basis is 60% and may increase to 100%, in Greece the basis is 50% and may increase to 70%. In some countries wage replacement depends on tenure or the employment sector.

There are some regional similarities in compensation policies. In Spain, Portugal, and Italy, the compensation rate rises with time spent on sick leave (from 50% at the beginning of the illness to 75% depending on the duration of sick leave). In Germany, Austria, Hungary, and Belgium the compensation rate decreases with time spent on sick leave from the full salary (Germany, Austria, and Belgium) to 60%.

However, some countries (the Netherlands, the United Kingdom, Austria, Hungary, Romania, Slovakia, Denmark, and Belgium) have set upper limits for SA compensation. Lithuania is the only country that has established upper and lower limits for SA compensation. Portugal has set the lower limit for sickness compensation in a such way that in some cases the benefit is equal to one's earnings (18).

Duration of paid sickness

Maximum duration of paid sickness is mostly up to 1 year. 6 consecutive months are usually paid in Estonia, Romania, Poland, Malta, Italy, Latvia, Lithuania, Greece, and Cyprus. One year SA (with extensions in some cases) is acceptable in Sweden, Austria, Hungary, Slovenia, Slovakia, Czechia, Finland, Norway, Iceland, Denmark, Spain, Belgium, Germany (78 weeks during 3 years), and Croatia (1.5 years) (17,18).

Longer sick pay is provided in the Netherlands (2 years), Ireland (2 years), and Portugal (3 years) (18).

Employer's responsibility for sickness absence compensation

Only in Portugal, Romania, Ireland, and Greece there is no employer's responsibility for SA compensation. In most EU countries the employers pay sickness compensation up to the 14th day of illness.

In Germany the employers continue to pay the wages during the first six weeks, in Denmark up to one month, in Belgium up to one month, in Finland up to 2 months, in Croatia the first 42 days, in Austria and Iceland up to 12 weeks, in Luxembourg 13 weeks, and in the United Kingdom up to 28 weeks. In Malta an employer pays the difference between the wage and benefit. Only in the Netherlands the employers cover the full length of the illness (18,19).

Medical certificate

A medical certificate in case of absence is required in most countries; only in Denmark it is not obligatory. Usually the illness has to be certified from the first day of absence.

In Norway, Sweden, and the United Kingdom, medical leave is required from day 8, in Germany the illness has to be certified from the 4th day of absence, in Luxembourg from day 3 (17,18).

Some countries allow part-time leave: Cyprus, Denmark, Malta, Romania, Sweden, the Netherlands, and Finland (18).

2.3. Sickness absence as a problem

SA is a major public health and socio-economic problem, especially in countries with generous sickness compensation systems (2,20). With growing economy and generosity of sickness insurance systems the expenditures for sickness benefits have risen in the vast majority of European countries (19,22). The main problems that the countries face are the high cost of SA, the burden for social security systems, and passive consumption of benefits by employees, which lowers active participation in the labour market and even forces early retirement.

Finding and keeping the balance between the need for SA and its reasonable duration is the common issue for all the parties involved: governments, employers, and employees.

On average 2–4% of employees are on sick leave every day (23), and the cost of SA in the EU is approximately 1.5–4% of the GDP (20). Although these numbers represent estimates in the 1980s and the 1990s, they have not changed much. This is due to a complex and multifactorial nature of absenteeism: SA reacts to economic situations, the composition of the labour force, especially to the ageing of the population, and many other political and populational influences (24).

Because of reporting differences between countries and different baseline data in several studies the estimated SA costs and rates vary.

One of the first papers describing international trends in SA based on nine countries for the years 1950–68 showed increased frequency and severity of SA over the study period. The upward trend was shown for Great Britain, Sweden, the Netherlands, West Germany, Italy, and Czechoslovakia while only the USA, Yugoslavia, and Poland had stable SA. Furthermore, in the Netherlands SA doubled from the 1960s to the 1980s, showing the peak level in 1978 and 1979 (25).

According to a panel study of 18 European countries, the share of employees who were on sick leave (as a percentage of the employed population) was on average 2.8% in 1995–2003 in the EU countries (26).

The mean absence rate in European countries in the years 2008–2009 was 3.8%, absence ranged from 0.8% to 7.7%. An absence level above 4% was observed in Norway, Finland, Denmark, Netherlands, Portugal, Spain, Czechia, Bulgaria, and Estonia (22).

Even when the proportion of employees on sick leave has been rather stable for at least two past decades, the amount of days spent on sick leave and the economic burden generated by employee illnesses have risen dramatically.

Public spending on sickness benefits in a selection of European countries ranges from 0.15% to 2.18% of the GDP in the 1980s, from 0.09% to 1.55% of the GDP in the 1990s (26), and from 0.29% to 5.4% in 2008–2009 (22). However, the data on the cost of absence is scarce.

A study by the European Foundation for the Improvement of Living and Working Conditions analysing absence from work noted the emergence of two different approaches in dealing with the SA problem. One set of countries: Austria, Belgium, Denmark, Finland, and Norway, focuses on the promotion of workplace health while the other group, mainly from Eastern Europe, also Estonia, focuses on cost control (22).

At the end of the 1980s older EU member countries started to deal with workplace absenteeism because of the increasing number of unemployed workers and rising expenditure on social security. The first steps enhanced employers' and employees' responsibility in handling absenteeism and changed the prerequisites for the benefits and restricted the benefits (20,27). In the short run the restrictions resulted in a sharp reduction of absences but failed to have lasting effect (28). Although the replacement rates were cut down in many countries around the 1990s, the overall generosity of insurance systems has increased, that is, wider coverage of persons entitled to insurance, longer duration of the insurance period (26).

From a medical point of view some conditions, such as musculosceletal and mental disorders, have high recurrence and high prevalence. Of the total number of recurrent sick days 37% accounted for musculosceletal and at least 21% for mental disorders (29). Recurrence of long-lasting sick leave could be avoided by several return-to-work processes, but due to the complexity of influencing mechanisms there can be several outcomes and different transitions for persons between rehabilitation, disability schemes, and participation in the labour market (30). There is some evidence that even tailored interventions for return

to work do not lower the recurrence of SA in employees with mental problems (31) and that working conditions and health behaviour do not reduce the elevated risk of recurrence of SA after longer episodes of SA (32). At the same time there are some evidence of successful and effective prevention of recurrent SA and effective personalized return to work programmes (33–35).

Also, for preventive purposes several risk factors have been identified that predict recurrence of SA or unsuccessful return to work (36–38). Additionally, the choices in enhancing faster recovery and workability include the treatment strategies of diseases producing high SA (36,39).

Long-term SA is a serious risk for disability (40–42). Persons who are absent from work due to sickness more than 15 days per year pose a higher risk of early retirement (41). By diagnostic groups the risk for disability pension is especially high for those with mental, musculoskeletal, and gastrointestinal disorders (42). Moving to disability schemes is a one-way exit from the labour market. Once a person has been moved to a disability scheme, it is almost impossible to leave it (43).

It has been observed that disability rises remarkably after increased unemployment (28).

2.4. Influence of sickness absence compensation practices on sickness absence

There is common agreement that SA is determined not only by the illness or the health status of the individual, but it is a multi-factorial phenomenon (6,12).

The generosity of SA policies is related to SA behaviour. Countries with generous insurance schemes show higher expenditures on SA compensation and an increased burden of SA (12) as compared to countries with more stringent insurance policies (48). Comparative studies of SA in 11 European countries (in 1997) and in 18 European countries (in 2004) reveal that the higher the rate of compensation, the higher is the amount of absences (26,44) and the longer are the absences (45).

Fiscal tensions tend to be higher if insurance is provided mainly by the national insurance funds and employers' responsibility is absent or low (26,28). Moreover, increased employer's responsibility lowers SA (26). As compared to the Nordic countries where absence rates are high and employer-provided wage replacement is low, the countries that practise longer periods of wage replacement by employers, among them Austria, Germany, Italy, and Switzerland, have lower absence rates (28).

The Dutch experience in shifting all SA costs to employers in 1996 led to a considerable decline in SA while before that, in the 1980s, their SA was extremely high and the amount of sick days per person per year was 39; for comparison, in Belgium it was 20 (25). Related to that, the expenditure on daily allowance was also very high (46). Lower SA in Belgium at that time was considered to be related to small sickness benefits and diverse control procedures (25).

Individual absence monitoring also plays a role in SA. In the middle of the 2000s Danish and Spanish public authorities started to follow up long-term SA cases or cases which were longer than expected. In Norway and the Netherlands the employer and the employee must prepare together a reintegration plan for absence cases longer than eight weeks and then periodically re-evaluate it. Even more, the monitoring of absences has a stronger effect on absence rates if accompanied by sanctions for those who do not follow the rules (28).

There is even some evidence that stricter monitoring rules for absentees may have more disciplining effect on SA than monetary incentives (47).

The waiting period can also be considered as a stringent rule.

Conversely, permission of self-certification of SAs may contribute to the use of short-term absences (48). In the 1990s many countries allowed self-certification of SA, that is, absence without medical confirmation of illness: Austria 2 days, Hungary and Norway 3 days, Sweden 6 days, and UK 7 days. In cases where self-certification was allowed and the compensation rate was high (over 80% of wage) and there was no waiting period, the SA rates were remarkably higher than in the case of not so generous systems (44).

As long-term absenteeism accounts for a large part of sickness insurance costs, it is noteworthy that the maximum duration limit for SA determines SA behaviour. The highest SA ending happens closest to the maximum allowed SA time while meanwhile all the other time-points are attenuated (2).

2.5. Measurement of sickness absence

The measures used in SA studies vary to a considerable degree. It is due to differences in data collection, terminology, and social security arrangements across countries. Also, the measures vary by the research field, which are different in epidemiologic, economic, insurance, psychological, and sociological studies (6). Therefore, cross-national comparisons or even overviews are difficult to make (44,48,49).

SA rate and *mean length of sick-leave episodes* are the commonly used measures in national statistics of SA, though there are different definitions for the rate. The SA rate can be calculated as the annual number of sick days per number of persons qualified for SA insurance or as the annual number of sick days per working days or calendar days. The mean length of sick-leave episodes is a measure of the annual number of sick days per annual number of sick-leave episodes. These measures are mainly addressed to obtain a quick overview of the distribution of sick days among the labour force and the disbursement of benefits.

For better comparisons and understanding Hensing et al. performed a thorough analysis of the literature and found that the measures used in studies are mainly based upon three entities: spells, i.e. SA episodes, days, and persons (49,50). However, these entities are used in many ways.

As is known, the choice of measures can influence the study results (51). Based on study of Hensing et al (49) which reviewed the literature of SA measurement, the authors suggest five basic measures for assessing SA: frequency of sick leave, incidence rate, cumulative incidence, and length and duration of absence.

Three of them – frequency of sick leave, incidence rate and cumulative incidence – can be considered as population level measures, i.e. measures that characterize ill health of the whole working population or the magnitude of problems causing temporary inability to work.

- *Cumulative incidence* is a useful measure in systems where all the SAs are registered, even those without compensation. It helps to evaluate the influence of big events on the SA of the population, such as epidemics, recessions, policy changes, nationwide intervention programmes, because it focusses on the number of unique sick-leave users.
- *SA frequency* can be a more useful measure for SA behaviour. In addition to indication of the severity of the disease, the amount of overall sick-leave episodes may reflect traditions of sick-leave use, that is, how easily the person decides to stay on sick leave. Also, it may be influenced by the working environment.
- *Incidence rate* can be assessed as a measure of ill health and different SA behaviour concurrently with absentee level measures because it takes at the same time into account the amount of sick leave and sick days. It can be useful for observation of longer time periods.

Two of suggested measures – length and duration of absence – can be considered as absentee level measures which characterize the health or health behaviour of the restricted population, that is, the population of sick-leave users. These measures can be used to assess the effect of positive or negative events which affect absentees. For instance, one can assess the effectiveness of different kinds of interventions dealing with SA. One can also assess the severity of illness by disease groups or the effectiveness of change in treatment approaches.

- *Duration of absence* shows the mean number of days spent in sick leave, and thus reflect severity of illness or the SA behaviour of absentees.
- *Length of absence* measures the number of absent days among absentees. It can be used to assess the burden of illness in a workplace, region, or society.

2.6. Risk factors of sickness absence

Individual risk factors

Gender

Gender differences in SA have been widely studied in scientific literature. Studies of gender differences in certain populations (11) or studies comparing SA between countries reveal that SA rates are mostly higher for women than for men (12,47). In many European countries, such as Finland, Denmark, Sweden, Norway, France, the Netherlands, Belgium, Portugal, Ireland, Italy, Spain, and

the United Kingdom, SA occurrence among women has been 30–60% or even higher than in men (11,47,53). The European foundation overview of SA in European countries describes Estonia and Germany as the minority of countries where gender differences in SA are not expressed (22).

According to some studies, the gender gap in SA seems to be widening in favour of women's SA (52,54).

Higher absence at the population level among women is explained by general health, personality differences in women, different types and degrees of exposure to work-related stressors, including psychosocial risk factors at work or the different occupations held by men and women (11,19,32,51,55). Also, higher absence is explained with the 'double-work hypothesis', which means that women shoulder higher responsibility for domestic duties (44). As is known, different occupations only slightly influence the excess risk of SA in women (11) whereas work-related psychosocial factors, especially emotional demands explain a large part of excess risk of SA among women (19). According to the literature, the trend becomes opposite in the age group of 55–64-year-old employees – in this age group SA is higher for men in the majority of the countries (44).

The duration of absences does not reveal any clear gender-related trend. Some authors have shown that women take longer sick leave than men. According to one study, in the case of sick leave lasting less than a month, the distribution of women and men is equal while in the case of sick leave lasting from one to two months or longer than three months the proportion of women accounts for two thirds (57). Other studies show that sick-listed women take more sick days per year than men and the risk of long-term SA is generally higher in women(54,58). Again, the trend becomes opposite for older employees – the risk of long-term SA is higher in men over 50 years old (54). Laaksonen et al found that women have more self-certified sick-leave episodes but not medically certified absences (11). Only a few studies show higher absence for all men at the absentee level (51,59).

Age

Research suggests that absence rates rise with age. At the same time, employees with longer tenure have higher absence rates even when adjusted to age, probably due to better job security effect (45).

Middle-aged employees are less common users of sick leave than older and younger workers (60). This skewed trend is explained by Markussen as a less strict set of norms of younger employees (2).

In terms of long-term SA an increase in age increases the risk of long-term sicknesses. Conversely, employees above the pension age show lower SA as compared to older employees of working age. The most popular explanation for that is that healthier employees stay at the labour market whereas less healthy people move to pension schemes (5).

Health condition

Persons with long-standing illnesses have higher SA rates than those without such illnesses (3,8,61). SA is also higher in persons with poorer self-rated health because it is determined by multiple health measures. Self-rated health has a stronger influence on SA than socio-demographic variables or psychosocial factors (62).

The most common diagnoses for sick leave are musculosceletal and psychiatric diseases (11). These conditions have the highest recurrence compared to other groups of diagnoses. According to Roelen, the median time of recurrence for musculosceletal diseases is 409 and for mental disorders 328 days after the initial episode (29). In all the main diagnostic groups, including musculosceletal and mental disorders, also neoplasms, there is a women's excess of SA. The only disease groups where men have higher occurrence of SA than women are circulatory and digestive disorders and injuries (11).

Work-related factors

Physical workload

A heavy physical workload is a definite risk factor for SA. Highly specific physical working conditions, such as lifting, carrying objects, extreme bending or twisting are all risk factors for long-term SA (61). Also, heavy physical workloads in general and hazardous exposure(56,57) are associated with SA episodes irrespective of their duration. One of explanations of the connection of adverse physical conditions on SA is purely mechanical – it provokes the onset or worsening of musculosceletal diseases. The other explanation is that experiencing harms or hazards in workplace, not limited to the physical workload, will exacerbate the health conditions leading to dissatisfaction with one's job, and dissatisfaction in turn is associated with SA (60).

Psychosocial factors

Psyhcosocial work factors are usually understood as job strain, decision latitude, social support, shift work, overtime work or work-life imbalance, bullying or discrimination, and job insecurity. All of these factors, most strongly bullying, are associated with higher SA according to a study of 31 countries (63). Overtime work could be a protective factor for SA but also a risk factor (45).

Studies that have measured the full scale of psychosocial effects of the working environment, using either Karasek's Job Content Questionnaire or its modifications, have found strong correlations with SA and psychosocial risk factors (6,64). In the demand-control theory (65) two aspects, work demands and job control, determine the psychosocial working conditions. High work demands in combination with low job control are associated with higher rates of SA (4) especially in lower-grade employees, whereas high job control is protective against SA (66). Some gender differences also exist – low job control increases the SA risk in women and job dissatisfaction in men (56).

Job satisfaction

In addition to the presence or absence of ill health, other individual factors may play a contributory and perhaps even decisive role in determining who takes sick leave (2,3,60).

Experiencing uncertainty, harm or hazards at one's workplace increase dissatisfaction with one's job (10,67) and SA may become a way of escaping from duties (6,10). Such observations were made already as early as in the 1960s as well as recently (2,3,10). The findings of a Finnish study show clearly that the prevalence of harm at the workplace are associated with the low level of job satisfaction, and this is associated with SA (60). Job dissatisfaction almost doubles the SA risk (4). Specifically, short-term SA (6) and frequent episodes (10) are related to job dissatisfaction.

Socio-economic factors

Income

Absence rates are clearly higher in low-wage workplaces (23). Also, the lower personal income is associated with higher SA rates, but the rate is not correlated with income. In a cohort of full-time workers the higher income group has 42% lower entry rate to absence than the lowest income group (2). Though, in a Finnish study SA probability has been found higher in higher wage categories (68). One explanations of the latter fact is that probably employees in the lowest income groups are more frequently temporarily employed (68).

Education

The employee's educational attainment plays an important role in absence behaviour (2,8). There is a steep increase in SA entry rates in every lower educational level. Despite the type of education, the lower the level, the higher are the absence rates (2). By comparison with persons with a high educational level, persons with lower educational levels take more likely 10 or more sick days in a year. There is a set of characteristics which influences SA behaviour: overweight, poor general health, a physically demanding job, high work demands, low job control (69).

Occupational class

SA, similarly to ill health (8), differs by socio-economic status (9). Lower socio-economic status (70) or lower occupational grades (8,66) are usually associated with a higher SA rate (2). Even more, the difference between employees of different socio-economic positions is widening: during the 1990s the SA rates increased among lower grade employees but not considerably in higher grade employees (68). The proportion of employees with SA among lower grade occupations is approximately two times higher than in higher grade employees (66), especially in men (58). The number of sick-leave episodes per person is up to six times higher in lower grade employees than in the highest grades (8).

Some excess in SA in lower occupational positions can be explained by adverse health behaviour, worse physical and psychosocial working conditions (66) and poorer self-rated health (8). Manual workers and lower-level employees were found to report reduced work capacity with higher probability than other workers on sick leave (57). Unskilled workers, especially with shorter tenure have a high recurrence of SA episodes (29).

Based on Whitehall II and GAZEL study cohorts, the SA rates for SA episodes more than eight days are approximately three times higher for lower employment grade than for higher employment grade employees (64). According to some authors, even when adjusted to health behaviour and psychosocial environment at workplace and outside of workplace, the effect of employment grade on SA is still stronger than the effect of self-rated health. Thus, this is not only worse health that mattes; higher SA in lower occupational positions is influenced by personal and societal attitudes in response to illness (2,64).

In addition to the occupational position, the SA rate is also influenced by the employment sector. Municipal and public sector employees show higher absences than private sector employees (5,72).

2.7. Sickness absence and labour market interaction

Unemployment, economic crises, and sickness absence

Unemployment and SA are counteractive indices. It has been proved that unemployment and SA are negatively correlated – the rising unemployment level reduces the number of sick days and vice versa (21).

Economic crises are usually accompanied by higher unemployment. Therefore, it has been thought that during recessions SA may decline due to changes in the composition of the labour force (73).

The other explanation of the decline in SA is the change in sickness behaviour of employees (74,75) called as the disciplining effect. Askildsen (74) showed that the disciplining effect of unemployment to SA can be even stronger in the population of stable workers than in short-time workers.

Paradoxically, increased unemployment due to downsizing increases the risk of longer absences in the remaining employees, especially in older workers (76). Downsizing provokes adverse changes in work characteristics including job insecurity, decreased spouse support, and provokes increased smoking, which could lead to health deterioration and longer absences (77).

2.8. Sickness absence reforms or policy changes in European countries

Earlier reforms

In the last decades of the 20th century many western European countries underwent considerable changes in their SA policies, including the regulations of sickness benefits. Actions taken during these changes were meant to control SA expenditures and to change the SA behaviour of employees.

Denmark

In Denmark, SA retrenchments were implemented in 1983. The compensation rules were different to public and private, blue- and white-collar employees. Generally, the SA benefit was reduced from 90% to 80% of the salary and one waiting day was introduced. The maximum duration of absence was fixed to two years. The employer's responsibility to pay for sickness rose from 5 weeks to 13 weeks in 1983; in 1987 the waiting day was abolished and employer's responsibility was lowered to 5 weeks and thereafter to 2 weeks. The maximum duration was lowered to 52 weeks. In 1990 the benefit level rose to 100%, but an upper limit was set for the benefit. Still, under some agreements employees were entitled to full salary in case of illness. Follow-up evaluations and reintegration plans by physicians and municipalities were introduced for monitoring absentees (27).

Netherlands

Economic crisis and rising rates of sickness and disability at the beginning of the 1980ies were the driving forces for the Dutch sickness reforms. The sick-pay scheme was totally reorganized – employer's responsibility to pay for SA compensation was introduced in 1994 when employers had to pay the wage replacement of sick employees for the first two or six weeks, in small and big companies, respectively. From 1996, instead of social security, the employers started to pay SA compensation for one year; in 2004 this period was increased to two years. Employers were also responsible for the reintegration of sick employees back to work. Wage replacement has been the same for all these years – at least 70% of the wage and in total no more than 170% of the wage for two years. The aim of the reform was to increase employer and employee involvement in reducing SA (78).

Sweden

In Sweden, between 1955 and 1987 the replacement rate in case of sickness was increased on three occasions and the number of waiting days was reduced from three days to one day. In 1987 the waiting day was abolished. The year 1991 witnessed the severest economic crisis since the 1930s, which led to extensive changes in SA management. The compensation rate for the first three days of sickness was cut down to 65%; for days 4 to 90 it was lowered to 80% from the previous 90% in all sick days, and for longer than 90-day absences it was 90%.

In 1992, in order to motivate employers to improve working conditions and to monitor their employees, the payment for the early period of sickness (10–28 days), was shifted to employers. Several consecutive changes were introduced in the 1990s to improve the pay system. In addition to the social security payment and the so-called 'employer period", there were several supplementary payment possibilities. Supplementary schemes were also provided in cases when a person's income exceeded the ceiling of compensation (21,79,80).

Germany

In Germany from the 1970s, employers paid 100% of the wage for the first six weeks. After that period 80% of the salary was paid by social security. In October 1996 the statutory sick pay was decreased from 100% to 80% of the salary during the first six weeks and in January 1997 the sick pay paid by mandatory health insurance was reduced from 80% to 70%; also the benefit cap decreased from 100% to 90% of the net wage. The decrease concerning employers' payment applied only to private-sector employees. The decrease in health insurance payment applied to both, private and public sector employees. Though, employees were entitled to cut their vacation by one day to every five sick days in order to avoid financial loss due to illness. The intention of the reform was to reduce labour costs, which were one of the highest in cross-country comparisons of labour costs per hour, and, thus, to achieve higher employment. The second goal was to reduce the moral hazard in SA insurance (81,82).

In 1999 the reform was repealed because of objection of trade unions and employees' discontent with the new situation. Thus, the strong tradition of collective bargaining and strong unions derailed this reform. Besides, after the reform, employees who were covered by collective bargaining contacts continued to receive full-salary compensation during their illness. The compensation for the first six weeks rose to 100%, but the sick-pay coverage by mandatory health insurance remained at 70% of one's salary (82).

Hungary

Around 1990s, the sick pay provided by the state was 85% of the wage; the first three days were covered by the employer. In 1992 the employer's responsibility for sick pay was increased to 10 days and in 1995 to 15 days. By the year 1993 the compensation rate was gradually reduced to 75% (83). The 2007 health reform introduced stricter rules for sick leave and absentee supervision. From 2013 the pay level for 15 days is 70% of the wage, thereafter 50–60% (84).

Later reforms

The recent economic recession in the late 2000s launched SA reforms in many European Union member countries, mostly younger members, albeit many of these reforms turned out to be indecisive.

Czechia

In Czechia**,** under the health reform of 2008 the compensation for the first three days in case of sickness was abolished (85); in the same year it was repealed because according to the decision of the Constitutional Court this restriction contradicted the Constitution (86). In April 2013 the same intention was declined by the Portugese Constitutional Court for the same reason – the reductions in sickness leave were unconstitutional (87).

Italy

In Italy, to lower SA in the public sector, the reform that changed the sick-leave compensation and monitoring rules of absentees came into force on 25 June 2008. Before the reform employees received full-income compensation during nine months of illness and for the first 10 days of illness compensation for productivity bonuses or other fringe benefits which usually amounted from 10 to 20% of one's salary.

The reform restricted the pay level to the basic wage for the first 10 days only. Also, a medical check-up by the physician appointed by a public authority became mandatory from the first day of illness instead of a medical certificate from the employee's general practitioner. The tightening of monitoring was restored to the pre-reform level a year later (47).

Latvia

In Latvia, on 1 January 2009 the duration of a paid sick-leave episode was cut down to 26 weeks, and the number of days paid by employers was cut from 15 to 10. The compensation level did not change (88). The main objective of this reform was to reduce labour force expenses and to cut budget expenditure due to the economic downturn (22).

Slovakia

Slovakia reformed all the social benefits in 2004. Before the reform all sickness benefits were paid by the state at the level of 55% of one's salary. After the reform the first 10 days of sickness leave is paid by the employer – the benefit during the first three days is 25% of daily gross wages; from day 4 through 10 it is 55%. From day 11 of sickness the social security continued to pay 55% of the wage. The aim of changes was to eliminate abuse of the sickness benefit (89).

Ireland

In Ireland, sick-leave entitlements for civil servants were cut down by half in March 2014. Previously, for certified sick leave the full pay up to 6 months and half-pay up to 6 month was provided; after the reform, both duration ceilings were set at 3 months.

Bulgaria
In Bulgaria, as one of the 'anti-crisis' measures, the sickness compensation paid by employers was prolonged to three days instead on one day, and the pay level for the three days was 70% instead of 100% for the first day. Social insurance continued to pay 80% of the wage (90).

Spain
In Spain, until 2012, public sector employees with temporary illness received sickness benefit of 100% of the wage up to 1 year. For private sector employees there was a three-day waiting period, the compensation rate of 60% for days 4 to 20 was paid by the employer; thereafter the social insurance continued to pay 75% of the wage. From 13 July 2012, after the reform public sector employees received 50% of their previous wages during the first three days of a sick-leave episode, 75% from day 4 until day 20, and 100% from day 21 onwards.

Estonia
Until 2009, the sickness benefit level was 80% of the salary and there was one waiting day. The sickness benefit in case of temporary illness was paid by the Estonian National Health Insurance Fund to all salaried employees on an equal basis. In 2009 cuts in sick pay were implemented in reaction to the economic crisis in Estonia. The benefit level was reduced from 80% to 70% of the salary and EHIF started the payment from the 9th day of sick leave. Employers started to pay for sick days from day 4 to day 8. For employees, the waiting period was extended to the first three days of sickness.

2.9. Influence of sick-pay cut policies on sickness absence

The epidemiological or economic impact of compensation policy changes have mostly been studied by Swedish and German researchers. They clearly showed that economic incentives towards SA corrections change the SA behaviour of employees (21,75,81).

In case of reductions in SA compensation the cost of being absent rises for employees, that is, their replacement income becomes smaller than they are accustomed to receive and this could motivate employees to change their SA behaviour. This assumption relies on the moral hazard theory, which is used in insurance economics (79). The moral hazard theory is popular when explaining the effect of generosity of SA compensation systems on absenteeism (91). According to the theory, individuals try to maximize utility from insurance (75,92).

However, the moral hazard is dissimilar for different subgroups. Moral hazard influences SA more in shorter or easier sick-leave cases where there is more space for behavioural adjustments (79,81,92,93), that is, a person chooses whether to stay on sick leave or not. Persons with more serious illnesses are less

distracted from moral hazard problems and thus change their SA behaviour to a lesser extent during sick-pay cuts or other sickness policy changes (93).

The moral hazard problem is particularly pronounced among people with lower job security where the risk due to the decision to stay on sick leave can lead to unbearable loss of income or losing the job (92). These people react most strongly to sick-pay cuts or other sickness policy changes (81,93).

Generally, the evidence gained from the so-called natural experiment studies and other sick-pay cut studies shows that in response to sickness benefit reductions or the introduction of waiting days, the number of employees with no days of absence rises and the total number of absent days and the incidence of absence decreases (79,81,82). At the same time it has been shown that stringent rules for SA compensation have different impact on employees depending on their age, income, or social position and therefore in some sub-groups the absence rate may increase.

In German experience the sick-pay cut in 1996, when the sick pay was reduced from 100% to 80% during the first six weeks, was causally related to the increase in the proportion of employees without any sick-leave days. In the target population of the reform the number of employees with no sick days rose by 6% and 8%; in the sub-group of the target population where the reform was implemented with no exceptions, the proportion of non-absent employees increased by 15% and 20% and the number of absent days decreased by 30%. The mean number of absent days decreased from 6.05 to 5.01 (81).

In a study which observed the effects of the reform among those who used SA shorter than six weeks (the period which was covered by employer), the decrease of absence was most evident in short absences, under 15 sick days per year. Among the population with up to 5.5 absence days per year the decrease in the use of sick leave was the highest, about 12%. According to a study of the second reform, during which the sick pay was cut by 10%, from 80% to 70% after the sixth week of absence, the overall incidence and duration of sick-leave episodes longer than six weeks did not change (93).

Among employees with all absences, short and long absences, the distribution of sick days according to quantile estimates by deciles showed that 80% of employees used less than 14 sick days in the pre-reform period, and this amount dropped by 1.3 days in the post-reform period. However, the reduction of sick days became statistically significant by the ninth decile where the drop was 4.8 days, i.e. more than 20%. It means that the reform reduced longer absences in the meaning of accumulated absence days over a calendar year. This reduction may come from the accumulation of many shorter SA episodes because continuous episodes lasting more than six weeks were reduced by 2–3 percentage points (82).

The effect of heterogeneity revealed that SA behaviour changed more among some specific employee groups. Short absences decreased among employees with no or low fringe benefits, among employees with work conflicts, and among employees of small companies (81). Duration of long-term absences decreased in poorer employees and middle-aged full-time employees (93).

At the same time older employees change their SA behaviour less than younger ones. The authors explain it with the assumption that the SA of older employees, over 55 years, may be driven more by health concerns and is less influenced by financial incentives. The reform also reduced the number of hospital stays and days spent in hospital. As for satisfaction with one's health and health at present, the reform had no effect during the four following years (82).

The time series analyses of several Swedish sick-pay reforms in 1963, 1967, 1974, 1987, 1991, 1995, and 1998, which encompassed changes towards both, generous sick pay and stringent sick pay, show that after the favourable reforms in 1963, 1967, 1974, and 1998 the number of sick days increased, and after the stringent reforms in 1987, 1991, and 1995 the number of sick days decreased. The overall decrease in sick days per insured person after the 1987 reform was 5%. The annual number of sick days after the 1991 reform decreased by 3.3% while the immediate drop was 20%. The number of SA episodes decreased by 23% (21).

Two Swedish reforms, which included the introduction of one waiting day in 1987 and the lowering of the sickness benefit from 90% to 65% for the first three days and from 90% to 80% for days 4–90 in 1991, changed considerably the SA behaviour of employees. After both reforms among absences lasting from 1 to 7 days, the incidence of 1–3-day absences became more frequent than before. Also, the timing effect of ending absences was observed. As the payment policy was also changed and the compensation of non-working days was abolished, the proportion of 6-day absences decreased considerably (80). At the same time persons with musculoskeletal and cardiovascular diagnoses, injuries, and poisonings changed their SA less.

The incidence of SA fell by 25% in women and 32% in men, but the proportion of longer sick leave (15–356 days) rose. At the same time the risk of sickness incidence increased among men above 50 years and longer sick leave among them increased in absolute terms (94,95). According to Johansson and Palme (79), the reduction of SA incidence was due to increased direct costs of starting the absences.

The Italian reform which reduced the civil servants' pay level just for the first 10 days of absence by about 10–20% and applied stricter monitoring rules for absentees, including random inspections at home, caused a 49% decrease in sick days. As the reduced amount of SA compensation depended on the non-basic fringe wage, the higher was the non-basic wage, the more SA decreased, i.e. the shorter were absences. As from the 11th day of sickness the previous full-salary compensation was still covered, the longer absences, contrary to the shorter ones, prolonged. Average duration of over 10-day absences increased from 24.05 to 25.15 days (72). When a year later monitoring was reset to the pre-reform level, SA rose to the pre-reform level although the pay scheme did not change.

2.10. Background of the present studies: sickness absence in Estonia

This section sets the scene for Studies I, II, and III. The graphic illustrations presented here are based on the data of Statistics Estonia and the EHIF and were prepared by the author of the present thesis.

2.10.1. Sickness absence allowance

In Estonia all employees who are insured through an employer or a contractual partner and self-employed persons are entitled to a sickness benefit in case of temporary incapacity for work in case of illness. The same sickness benefit rates are applied to all employees on an equal basis irrespective of their contract duration or whether they are employed by private companies or public institutions.

Since 2009 there has been a waiting period of 3 days which is not covered by the benefit. The sickness benefit is paid from day 4 to day 8 by the employer and thereafter by the obligatory and solidarity-based EHIF, which covers also health care services. The benefit is calculated from official income and is based on the social tax paid for the employee during the calendar year preceding the illness. The benefit rate is 70% of earnings in case of inpatient or outpatient treatment and 100% in case of an injury sustained at work or an occupational disease.

A medical certificate of incapacity for work is required from the first day of illness.

2.10.2. The key trends of sickness absence, disability, and unemployment

In Estonia, from the year of independence in 1991 until 2001, every county had its own health insurance fund which organized the management of sickness benefits. A unitary organization, the EHIF was established in 2001, and computerized SA data for the whole country has been available since 2002.

Estonia witnessed rapid economic growth from the early 2000s to 2008 when the employment rate for the age group 15–64 increased, the unemployment rate decreased to 5% in 2007 (Figure 1), and the mean gross salary doubled (Figure 2). Starting from 2011 the employment rate has increased in Estonia and unemployment mirrors the trend.

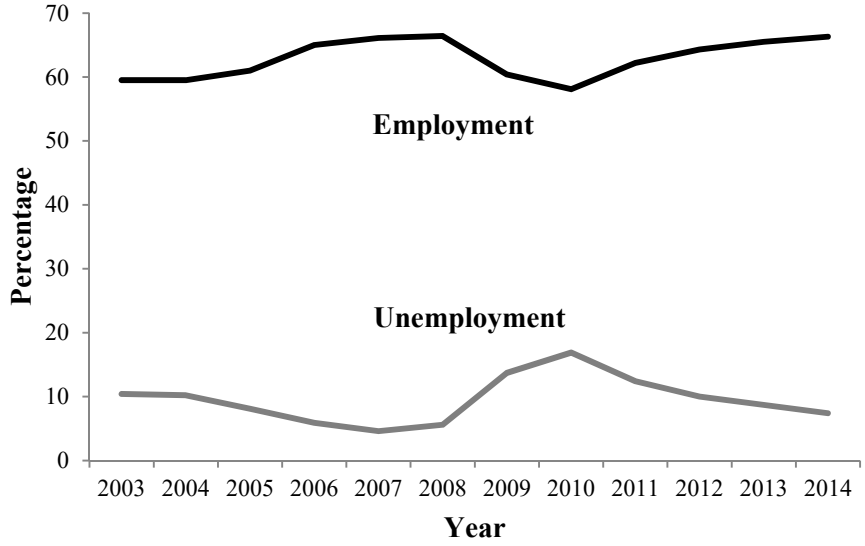

Figure 1. Employment and unemployment levels for the 15–64-year-old population of Estonia, 2003–2014. Source: Statistics Estonia

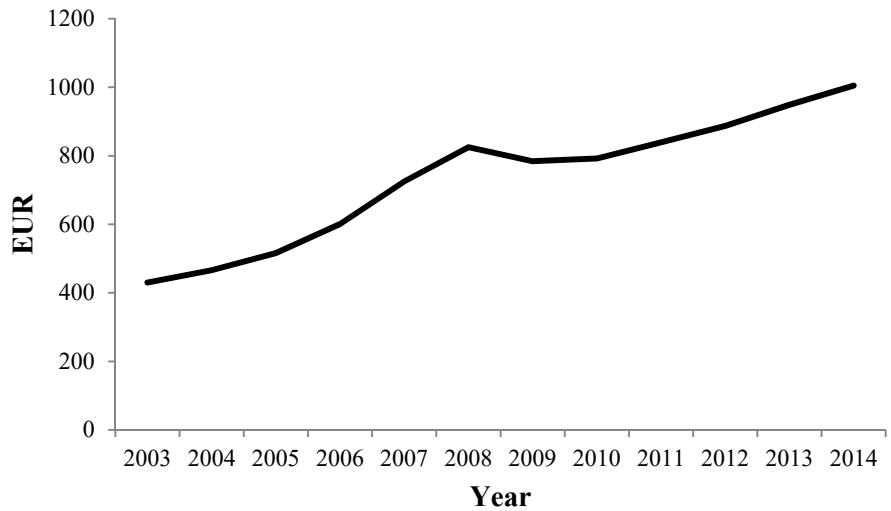

Figure 2. Mean gross monthly salary in Estonia, 2003–2014. Source: Statistics Estonia

Figure 2 shows that the salary doubled from 2003 to 2008. After a slight drop during the deepest recession in 2009–2010, monthly salary continued to rise consistently. In parallel to economic growth and increase of salaries, SA and its expenditure increased steadily from 2003 to 2008 (Figures 3 and 4). The SA rate increased from 8.1 days per employee in 2003 to 9.7 days in 2008 while the total amount of absent days increased by 25%.

In 2007 the amount of active employees in the labour market peaked during the independence (Figure 3). Before the sick-pay cut the number of employees and sick-leave episodes show similar trends and follow the economic cycle – rise until 2007 and sharp decline from 2009. The widened gap between the number of employees and the number of sick-leave episodes since 2009, the year when the sick-pay cut was introduced, shows the outcome of the reform.

By the year 2008 the absence days per employee in Estonia were as high as in the Nordic countries, known as the countries with a high SA prevalence (22). The total amount paid for sickness benefits increased by 15–25% annually in parallel to the increase of salaries during the economic boom (Figure 4).

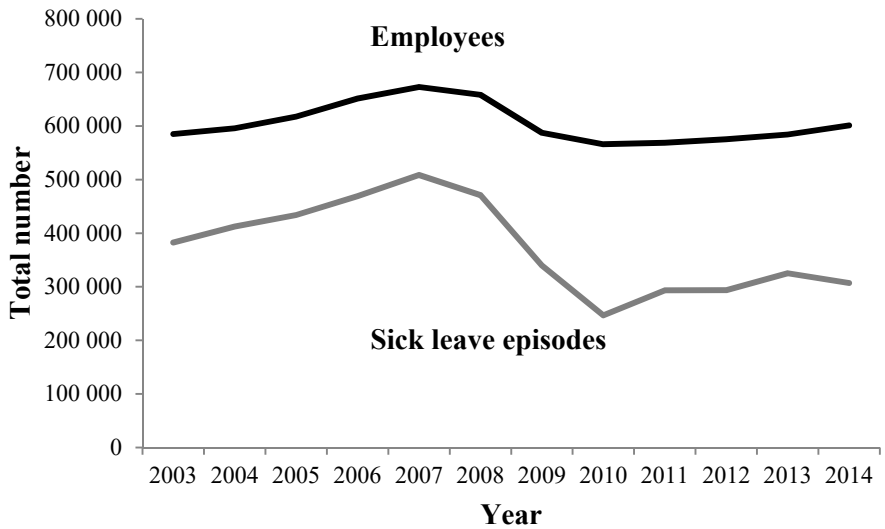

Figure 3. Number of employees and sick-leave episodes in Estonia, 2003–2014.

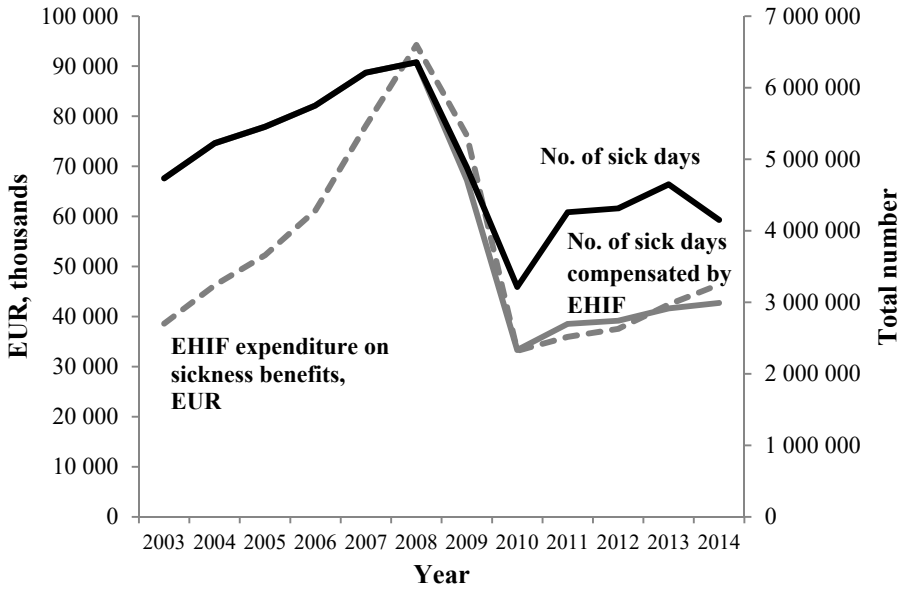

Figure 4. Number of sick days (left axis) and expenditure (right axis) on sickness benefits in Estonia, 2003–2014.

Until 2008 the number of sick days and expenditure on sickness benefits showed an increase. A sharp decline in both shows the outcome of the SA reform implemented in 2009. Figure 4 shows the general decline in the number of sick days and the decline of sick days from the perspective of EHIF expenditures. As EHIF stopped the compensation of sick days lasting less than eight days, the number of EHIF-compensated sick days is a quarter lower than the number of all sick days.

Before the reform, in the years 2004–2008, the mean duration of sick-leave episodes ranged between 12 and 13 days; after the reform since 2009 it has been between 13 and 15 days.

By 2008 the sum of sickness benefits compensated by EHIF totalled 94 million euros (Figure 4) and accounted for 12% of the total health insurance expenditure.

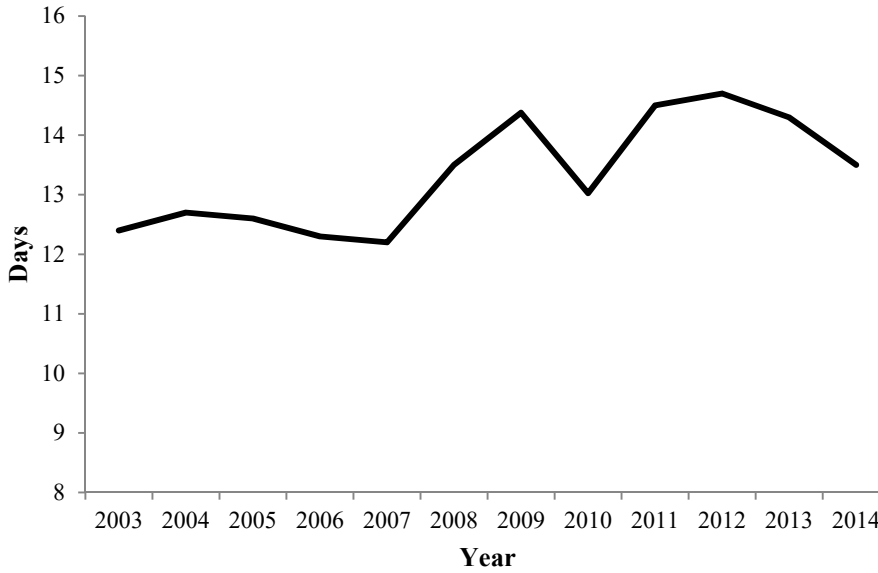

Figure 5. Mean duration of sick-leave episodes in Estonia, 2003–2014.

2.10.3. Sick-pay cut reform

When the economic crisis hit Estonia in 2008, the total workforce decreased by more than 8%; the unemployment rate reached 17.4% in 2010 as compared to 5% in 2007. The government implemented a negative state budget and among other changes cut considerably the sickness benefit rates. The new system became law in July 2009.

The short-term effect of the reform was remarkable. The total number of medically certified sick days decreased by one third and the health insurance costs of sickness benefits decreased by two thirds. In 2010 the health insurance costs on sickness benefits amounted to 33 million euros (96) (Figure 4). The proportion of benefits dropped from 11.8% of the health insurance budget of EHIF in 2008 to 4.8% in 2010 and has remained at about 5% since then. Thus, the goal to curb public expenditure was successfully implemented.

This reduction in EHIF costs was achieved by reducing the benefit level from 80% to 70% of the salary and starting the payment from day 9 of sick leave instead of day 2 previously. For employees, the waiting period was extended from 1 to 3 first days of sickness and employers started to pay for sick days from day 4 to day 8.

Introduction of employer's responsibility to pay SA compensation at the beginning of SA was aimed to motivate employers to improve working conditions and the environment for lower sickness absenteeism.

From the year 2011 when economy started to stabilize and the mean gross salary started to rise, there was an adaptation of the regulation implemented in 2009. SA had increased but did not rise to the peak level in 2008. An increase in absence, that is, in the number of sick days and episodes, was partly due to the higher number of persons in the labour market.

In order to reduce unofficial working, a new regulation which obliged to register all employees at the Estonian Tax and Customs Board from the first day of their employment was implemented in July 2014. This may additionally influence the increased employment.

Differently from sick-leave episodes, which had shown a rising trend before the reform and a declining trend after the reform, the mean duration of sick-leave episodes popped up. In the pre-reform years it was highest in 2008 at 13.5 days per sick leave; after the reform it has remained over 14 days.

Thus, from the early years of the 21st century the SA followed the rising trend of economy and employment. The concurrent economic crisis and the implementation of stricter rules for benefit entitlement in 2008–2009 ended in a remarkable decrease in SA and related costs. When economy recovered and the labour force adapted to the stricter rules, the SA increased slightly and then stabilized.

3. AIMS OF THE STUDY

The general aim of the present study is to identify the patterns of SA use and the influence of the sickness benefit reform on SA behaviour in different population groups. This knowledge helps us to bring out the aspects which need to be addressed in order to design SA policies in an efficient way.

The specific objectives of the study are as follows:

1. to investigate which work-related, individual, and health factors, other than current illness, influence SA among Estonian paid employees (Study I);
2. to determine the SA patterns on the level of the working population and on the level of absentees (Study II, Study III);
3. to analyse short-term changes in sick-leave use after the implementation of the sick-pay cut policy in Estonia in 2009 (Study II, Study III).

4. MATERIALS AND METHODS

4.1. Risk factors of sickness absence

As the first step, an overview of the literature was prepared in order to identify all the factors influencing the use of sick leave. The identified SA risk factors were categorized according to Beemsterboer et al (97) into individual, health-related, and work-related factors. Thereafter the author analysed suitability of the available nationwide surveys to explore the risk factors of SA in present study. The author evaluated suitability of the following surveys: Health Behaviour among Estonian Adult Population (HBEAP) (98–101), the Estonian Health Interview Survey 2006 (ESTHIS) (102), the Estonian Social Survey, the Estonian Family and Fertility Survey, the European Working Conditions Survey**,** the Estonian Labour Force Survey**,** and the European Social Survey.

The final analysis was performed on the basis of the data of the ESTHIS (102). From all the surveys, ESTHIS is the only nationwide survey that covers large number of aspects of health as well as related socio-economic parameters, including those relevant for the present study, such as self-evaluation of general health, occurrence of chronic diseases, health behaviour, different characteristics of mental health, and the working environment. The target population of ESTHIS is permanent residents of Estonia aged 15–84, and the 2006 survey had 6434 respondents. The corrected response rate of ESTHIS is 60,2%.

As the ESTHIS questionnaire did not cover all potential factors related to SA, one had to exclude some subcategories mentioned in the literature, such as working relations, working circumstances, motivation. Figure 7 presents the resulting list of factors included in the analysis.

Because of the formulation of the ESTHIS question: “Are you currently or have you been on sick leave during the past four weeks“, the study sample included respondents who were on sick leave at the moment of the interview or who had been on sick leave during the past four weeks. The rest of the respondents were counted as non-sick-listed persons.

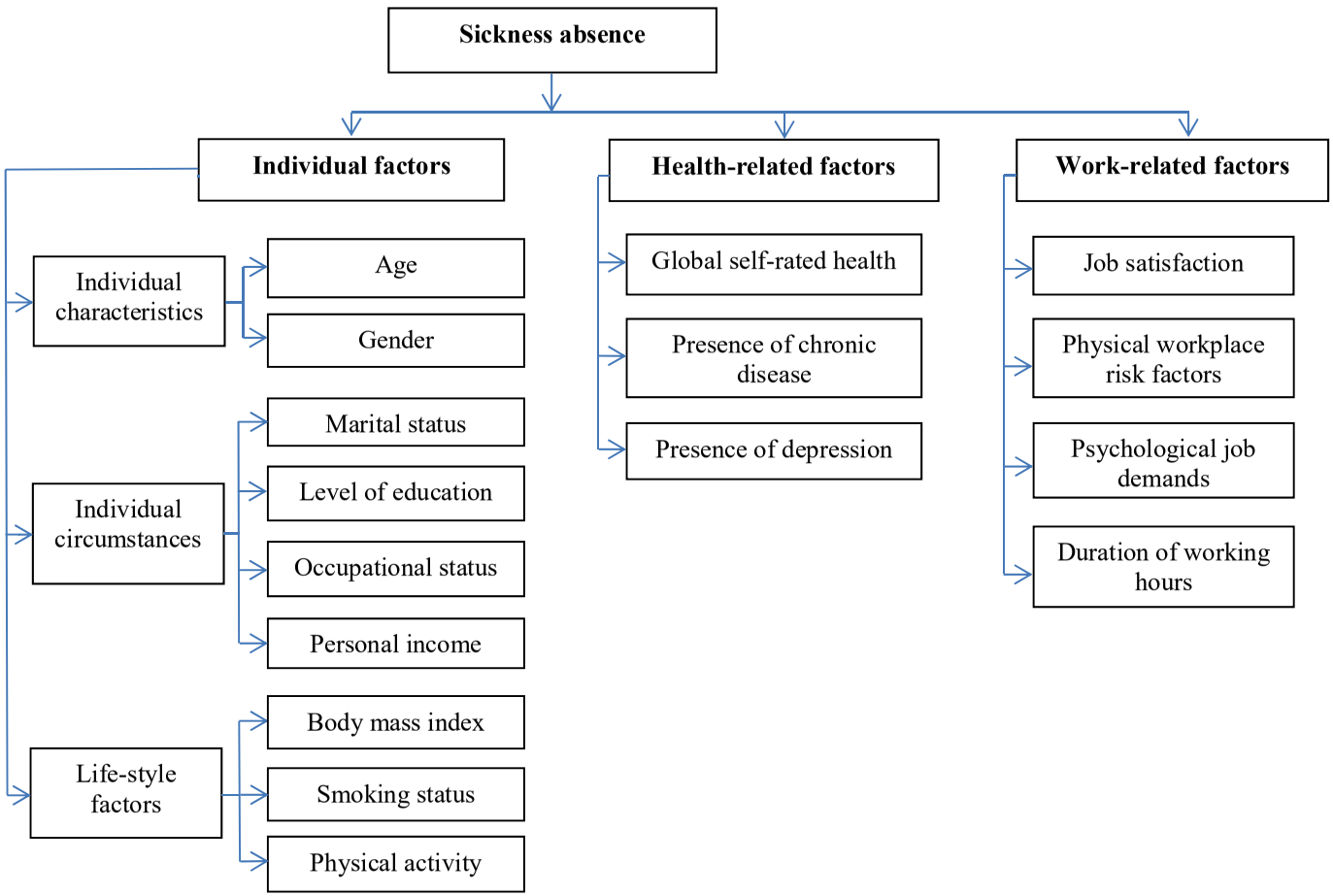

Figure 7. Factors associated with SA in addition to present illness. Based on Beemsteboer et al., 2008 (97).

Evaluation of the association between SA risk factors and SA

From the ESTHIS survey of 6434 respondents 2941 persons were selected who were employed at the time of interview, who were 18–64 years old, and provided information about SA. Being on sick leave was considered as a dependent variable, all the other determinants, that is, the SA risk factors showed in Figure 7, were analysed as independent variables.

Individual factors consisted of age and gender, personal income, level of education, occupational status, smoking, and body mass index. All the variables but for personal income were dichotomized as follows: age younger or older than 50 years; marital status: cohabiting/married, or living alone (single, widowed, or divorced); level of education: twelve or less years of education or thirteen and more years; smoking status: current smoker or non-smoker; body mass index (BMI) less or more than 30 kg/m^2. In multivariate models the age was used as a continuous variable.

Occupational status was divided according to the International Standard Classification of Occupations (ISCO)(103) into white- and blue-collar workers: ISCO codes 1–5 and 6–9, respectively.

The employees were divided into income quartiles according to their self-reported monthly individual salary. The quartile cut-off points were calculated in such a way that all employees with similar reported income remained in the same quartile. Thus, there is almost equal distribution of employees in quartiles: in the lowest quartile (<280 EUR) 26% of employees, in the 2nd quartile (280–415 EUR) 25% of employees, in the 3rd quartile (416–626 EUR) 23% of employees, and in the highest quartile (>626 EUR) 26% of employees.

The studied health-related factors included self-reported general self-rated health, chronic disease, and depressive mood. General self-rated health was dichotomized as good (based on answers ‘very good’ and ‘good’) or poor (‘moderate’, ‘poor’. or ‘very poor’). Depressive mood as a reflection of mental balance was evaluated according to the Emotional State Questionnaire (EST-Q2) (104) included in ESTHIS. The cut-off point of 12 was used to divide respondents into depressed or not depressed. Presence of chronic disease dichotomized whether one had or did not have a chronic disease.

Work-related factors consisted of job satisfaction, physical and psychological workplace risk factors and working hours. Job satisfaction was evaluated according to the question “How much are you satisfied with your job?“ and the respondents were dichotomized as satisfied (based on the answers ‘very satisfied’ and ‘satisfied’) or dissatisfied (‘not satisfied’ or ‘not satisfied at all’). Working hours were dichotomized to less or more than 40 hours per week.

Physical workplace risk factors were dichotomized based on the sum of the answers on four yes or no questions concerning uncomfortable working position, characterization of physical exertion, and dust or noise in the working environment. In case of two yes answers, the respondent was classified as having physical risk factors.

Psychological job demands were dichotomized based on the sum of the answers on four yes or no questions concerning the ability to decide about the

tempo of the work, monotonous tasks, demand of haste/speed of the work, and mental/psychological exertion. In case of two yes answers the respondent was classified as having psychological risk factors.

Logistic regression models were used to analyse the associations between sick leave and individual, health-related, and work-related risk factors.

First, univariate analysis was performed for the initial selection of relevant variables. The odds ratio was calculated to measure the association. All the variables showing significance in univariate analysis at 95% level were included in the multiple logistic regression model and adjusted for age and gender. Subsequently, multicollinearity was ruled out using the variance inflation factor.

Population-attributable fractions were calculated for significant risk factors of SA, using the formula PAF=*Pe*(OR-1)/(1+*Pe*(OR-1)), where *Pe* represents the prevalence of the risk factor in the study population.

R-programme and its statistical package for epidemiological analyses Epi were used for statistical analyses.

4.2. Sickness absence by socio-economic positions

Evaluation of SA patterns by socio-economic positions is based on the data of the nationwide survey HBEAP (98–101), as this is the only person-level dataset providing information on the use of sick days together with health and socio-economic characteristics. HBEAP is a postal questionnaire mailed to a representative sample of persons from 16 to 64 years.

For the purpose of this study the data on the occupational and income level, health status, and SA were used.

The adjusted response rates in the HBEAP surveys were 63.4% in 2004, 59.2% in 2006, 62.2% in 2008, and 62.3% in 2010. The response rates were higher for women and elderly people, but according to the respective HBEAP study reports, there were no significant age and gender differences between respondents and non-respondents.

Determination of the SA patterns in employees of different socio-economic positions

The data of the HBEAP study for the years 2004, 2006, 2008, and 2010 were used. The sample consisited of 7449 employed respondents aged 20–64 years. The data from the years 2004–2008 was pooled and defined as pre-reform and 2010 was a post-reform year. We used data from the respondents who were employed and had full information on their socio-economic and health status and SA use. The term ‘absentee’ is used for those employees who had used sick days.

The descriptive characteristics of blue- and white-collar employees were presented using means, SD, absolute numbers, and percentages.

To describe the SA patterns in blue- and white-collar employees, the SA measures suggested by Hensing et al. in 1998 were used: length of absence and cumulative incidence (49), additionally the distribution of annual sick days and the risk factors for SA were taken into account.

Differentiation of the study population by the socio-economic position was based on the occupational groups in the ISCO classification. ISCO skill level groups 1–5 (managers, professionals, technicians and associated professionals, clerical and support workers, services and sales workers) represented the white-collar group, and groups 6–9 (skilled agricultural, fishery and forestry workers, craft and related trades workers, plant and machine operators and assemblers, elementary occupations) represented the blue-collar group.

The information about SA and the income level were addressed in a questionnaire about the previous 12 months. The occupational level representing the socio-economic position, presence of chronic disease, and self-rated general health were asked for the present time. The main dependent variable SA was defined as being absent from work due to illness; the total number of absent days in the past 12 months was documented.

The income level was assessed from the net total average monthly income per family member from any sources and it was not adjusted for age or social status of family members. According to HBEAP methodology, in order to keep income comparable through the years, income was graded into four groups as follows: the lowest income level corresponds to the less than minimum Estonian salary level in the current year (<128 EUR in 2004, <255 EUR in 2010), the low income level to a minimum or less than the medium salary (128–256 EUR in 2004, 256–447 EUR in 2010), the medium income level to the approximately medium salary (257–447 EUR in 2004, 448–639 EUR in 2010), and the high income level to clearly above the medium salary (>447 EUR in 2004, >639 EUR in 2010) (98–101).

Descriptive variables for health status were dichotomized as follows: the presence of chronic disease was based on yes or no answers; general self-rated health dichotomization was drawn from a 5-point Likert-type scale so that the answers ‘very good’ and ‘good’ were considered as ‘good’, ‘average’, ‘bad’, and ‘very bad’ was considered as ‘bad’. Age was divided into three groups: 20–35, 36–55, and 56–64 years, representing younger, middle-aged, and older employees, respectively.

The length of absence was calculated by dividing annual sick days during the period under study by the number of absentees, and cumulative incidence was calculated by dividing the number of absentees by the number of employees in the study period. The SA rate was calculated as absent days per employee during the study period.

Evaluation of the change in sick-leave use by different socio-economic positions after the implementation of the sickness benefit reform

The change in the use of sick leave was measured by using the difference in the prevalence proportions of absentees before and after the reform. Blue- and

white-collar employees were evaluated separately. Statistical significance of the difference was assessed using the chi-squared test. The differences were considered statistically significant if *P*-values were less than 0.05.

To assess whether the SA measures of pre- and post-reform samples within both socio-economic groups differ, the Wilcoxon signed-rank test was used.

The odds ratios (OR) for SA risk factors, that is, gender, age, income, self-rated health and presence of chronic disease, and SA were calculated by the multivariate logistic regression model including a variable for differentiating the pre- and post-reform periods. A 95% confidence interval (CI) was used; the thresholds were set at $P < 0.05$.

The distribution of annual sick days used by absentees was assessed by means of the cumulative distribution function.

The statistical package Epi of the R-programme was used for statistical analysis.

4.3. Sickness absence at the population and absentee levels

Assessment of how the SA is revealed at the population level and what is happening at the level of absentees provides an overview of different aspects of absenteeism.

The study was based on the sick-leave data of the EHIF. Two datasets covered all the sick-leave episodes registered in EHIF, whether compensated by EHIF or not and irrespective of their duration, in 2008 and 2011. The 2010 data was not used because the changes in the registration procedure of sick leave in 2009 were known to contribute to underreporting, and thus the data for the first post-reform year could have been biased.

The absentee population was drawn from the EHIF register and all the 20–64-year-old persons on sick leave because of their own illness were included in the study. There were 227 981 sick-leave users in 2008 and 152 102 sick-leave users in 2011. The data for each sick-leave episode comprised its starting and ending date as well as the age and gender of the absentee.

The working population is the average number of employees aged 20–64 based on the statistics of Statistics Estonia, an agency that collects all statistics of national importance.

Determination of the SA patterns at the population and absentee levels

The SA patterns at the population and absentee levels were determined by three specific SA measures and two variables specific to the content of the SA reform. Three SA measures were originally suggested for epidemiological research by Hensing (49): the population-level measures include frequency of sick leave and cumulative incidence, and the absentee-level measure is duration of absence. The variables specific to the content of the SA reform were sick-leave episodes of different length and recurrence of sick leave.

The SA rate, a widely used measure in national statistics, was also calculated.

The measures were calculated as follows:

Frequency of sick leave (sick leave per employee) – current or new sick-leave episodes during the study period divided by the number of persons in the study group (including the currently sick-listed persons).

Cumulative incidence (absentees per employee) – persons with at least one new sick-leave episode, irrespective of duration during the study period divided by the number of persons at risk at the beginning of the sudy period.

SA rate (sick-days per employee) – absent days during the study period divided by the number of persons in the study group (including the currently sick-listed persons).

Duration of absence (duration of sick leave) – sick-leave days in new episodes during the study period divided by the number of new sick-leave episodes during the study period.

Episodes of different length were divided into 1–3, 4–8, 9–20, 21–30, 31–60, and >60 days, which means the waiting days (days 1–3), days with employer's responsibility (day 4–8), which was a new subject after the reform, medium (up to 21 days), and long-term episodes.

Recurrence of sick leave denotes the number of sick-leave episodes for a single absentee because it was important to learn whether the absentees consider useful to shrink recurrent absences. The absentees were divided into persons with 1, 2, and 3 or more sick-leave episodes per year.

Thus, the population-level patterns were assessed on the basis of the SA rate, cumulative incidence, and frequency of sick leave stratified according to gender and age groups, and the socio-economic position.

The absentee-level patterns were assessed on the basis of duration of absence stratified according to gender and age groups; the number of sick-leave episodes of different length and recurrence of sick leave were assessed for the whole population of absentees.

The term 'sick-leave' denotes a sick-leave episode.

Descriptive statistics of the study population and SA were performed.

All the results were evaluated in the year before the SA policy change and two years later, that is, in 2008 and 2011.

Evaluation of the change in sick-leave use at the population and absentee levels after the implementation of the sickness benefit reform

Rate ratios (RR) with 95% confidence intervals (95% CI) were computed to measure the differences in the absentee-level duration of absence and differences in the population-level frequency of sick leave between the post-reform time, that is, the year 2011, and the pre-reform time (2008). Forest-plot figures were used to illustrate the patterns of relative differences (RR) in SA measures of the studied years.

The associations between the sick-pay cut and all the absentee-level SA measures, that is duration of absence, sick-leave episodes of different length, and recurrence of sick leave, were investigated by the multivariate adjusted

logistic regression analyses with odds ratios (OR) and the corresponding 95% confidence intervals (CI). Thresholds were set at $P < 0.05$. The data was analysed with the R-programme software.

Ethics

The general ethical research guidelines adopted by the University of Tartu were followed. For the studies based on ESTHIS and HBEAP, the ethical approval was not required as the data of the anonymized national survey was used. The use of personal data in the study based on EHIF data was approved by the Estonian Data Protection Inspectorate (decision No. 2.2-3/13/121r).

5. RESULTS

5.1. Datasets

In a cross-sectional sample of the ESTHIS a total of 247 (8.4%) respondents out of the 2941 employed persons were on sick leave at the time of the interview or had been on sick leave recently, that is, during the preceding four weeks. The mean age of the persons on sick leave was 40.9 years and 49% of them were female (Study I).

The survey HBEAP included 5,674 employees in the pre-reform (2004–2008) sample, 35% (n=1987) of them were blue-collar employees and 65% (n=3687) were white-collar employees. The post-reform sample (2010) consists of 1,775 employees of whom 30% (n=528) were blue-collar and 70% (n=1274) were white-collar employees. The mean age of blue-collar employees was 43.2 and 43.8 years while the mean age of white-collar employees was 41.5 and 43.4 years in the pre- and post-reform samples (Study II).

Two thirds of the blue-collar employees were men and two-thirds of the white-collar employees were women. Most of the blue-collar employees had either a low or a very low income (68%) and had poor self-rated health (63–65%) as compared to the white-collar employees whose income was low or very low in 49–52% of the employees and 45–46% had poor self-rated health (Study II, Table 2).

The dataset of the register of the EHIF covered all the 20–64-year-old sick-leave users in Estonia and included 105 307 male absentees (33.1% of male employees) and 122 674 female absentees (40.8% of female employees) in 2008 and 67 508 male absentees (23.1% of male employees) and 84 594 female absentees (29.7% of female employees) in 2011. The mean age of men was 40.0 and 40.1 years; the mean age of women was 41.7 and 42.4 years in the pre- and post-reform samples (Study III, Table 1).

5.2. Risk factors of sickness absence other than current ill health

Among the studied risk factors of SA (Figure 7) eight appeared significant in the univariate analyses. These were low income ($P < 0.05$), low level of education, low occupational grade, poor self-rated health, chronic disease, depressive mood, dissatisfaction with one's job or a physically demanding job ($P < 0.001$) (Study I, Table 1).

According to the final model the use of sick leave was significantly associated with poor self-rated general health (OR 1.82; 95% CI 1.34–2.48; $P < 0.001$), presence of chronic disease (OR 1.66; 95% CI 1.21–2.27; $P < 0.001$), lower education (OR 1.59; 95% CI 1.20–2.12; $P < 0.001$), and dissatisfaction with one's job (OR 1.74, 95% CI 1.23–2.26; $P < 0.001$) (Study I, Table 2).

The population-attributable fractions for the SA risk factors were 29% for poor self-rated health, 12% for presence of chronic disease, 10% for job dissatisfaction.

Effect of the unemployment rate on sickness absence

Based on the HBEAP study, when adjusting pre-reform SA to the unemployment rate, the odds of using sick days were 6% smaller for every rising 1% of unemployment (OR 0.94; 95% CI 0.90–0.99, $P = 0.025$).

5.3. Sickness absence patterns

In order to establish patterns in the SA data collected continously in Estonia, the measures frequency of sick leave, cumulative incidence, duration of SA, and length of absence were used. Also, the study measured the SA rate, the distribution of absentees by different age groups, the distribution of annual sick days and the distribution of sick-leave episodes of different length, and recurrence of sick leave.

Most of the studied patterns of SA were stable despite the sick-pay cut reform, that is, during the periods 2004–2008 and 2010–2011. The only pattern which differs significantly in the post-reform period from the pre-reform period is the difference in cumulative incidence between blue- and white-collar employees before the the reform.

General patterns

Of all the absentees about two thirds used one sick-leave episode per year.

The largest number of sick-leave episodes lasted from 4–20 days (75% in 2008 and 67% in 2011).

More employees with a chronic disease than without it used sick leave, and more employees with poor self-rated health used sick leave than those with good self-rated health (Study II, Table 2).

Gender

All the population-level measures, the SA rate, cumulative incidence, and frequency of sick leave were higher in women while the absentee-level pattern, duration of absence, was higher in men.

For women the SA rate amounted to 10.2 days per employee in 2008 and 8.0 days in 2011. For men, the rate was 8.8 days per employee in 2008 and 6.4 days in 2011 (Figure 8).

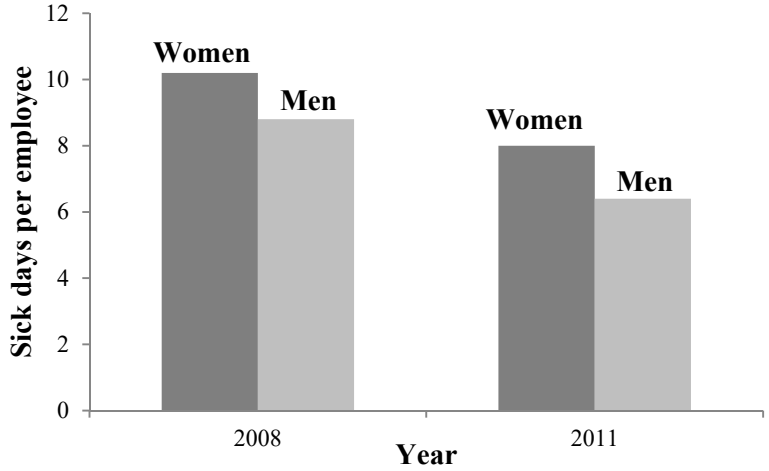

Figure 8. SA rate for men and women in Estonia, 2008 and 2011.
SA rate is higher for women in both studied years and is lower in the post-reform period in both genders.

Mean cumulative incidence, i.e. absentees per employee, was 0.41 in 2008 and 0.30 in 2011 for women; for men it was 0.33 in 2008 and 0.23 in 2011, respectively (Figure 9).

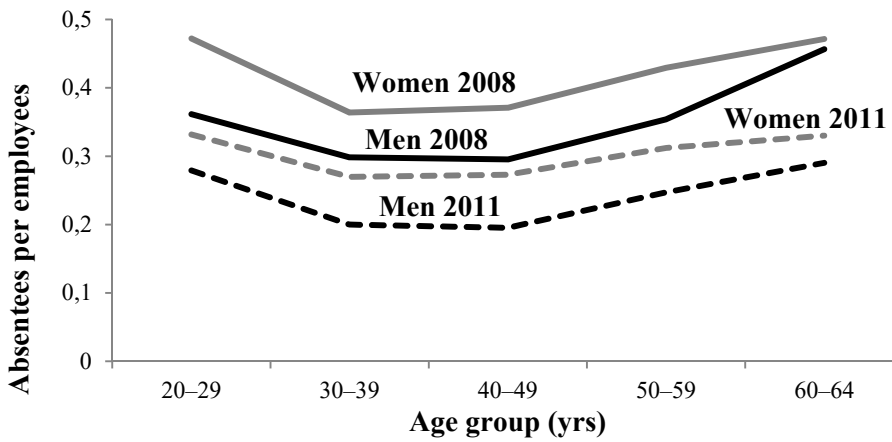

Figure 9. Cumulative incidence by age groups in men and women in Estonia, 2008 and 2011.
The number of absentees per employee is higher for women in both studied years and is lower in the post-reform period in both genders. The U-shaped line shows that the proportion of absentees among younger than 30 and older than 50-year-old employees is higher than among middle-aged employees.

The number of sick-leave episodes per employee was also higher in women (mean frequency of sick leave 0.66 in 2008 and 0.44 in 2011) than in men (0.53 in 2008 and 0.33 in 2011) in all the age groups ($p<0.01$) (Figure 10, Study II, figure 3).

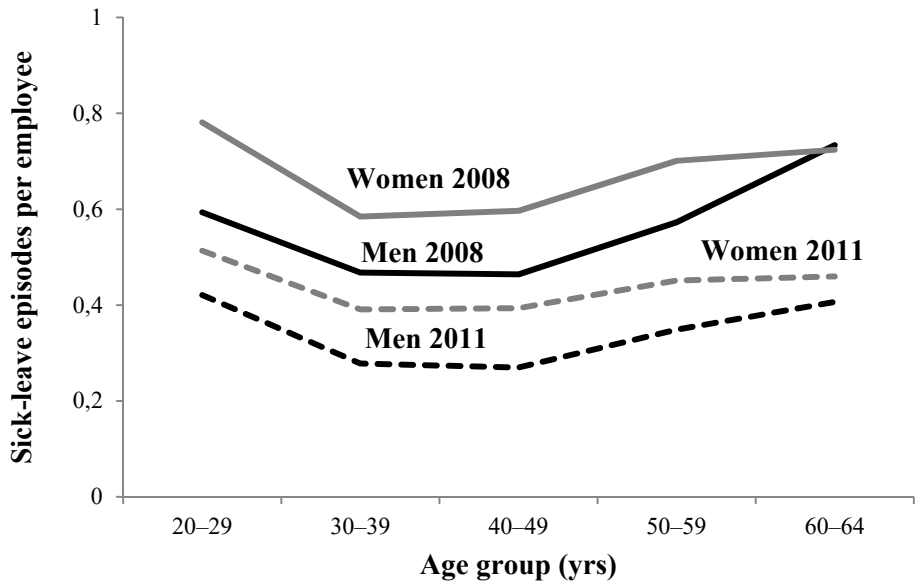

Figure 10. Frequency of sick leave by age groups in men and women in Estonia, 2008 and 2011.
The number of sick-leave episodes per employee is higher for women in both studied years and is lower in the post-reform period in both genders. The U-shaped line shows that younger than 30 and older than 50-year-old employees use more sick-leave episodes per employee than middle-aged employees.

The duration of absence was higher in men. Their mean duration of absence was 16.2 days per sick-leave episode in 2008 and 19.3 in 2011; for women it was 15.1 days in 2008 and 18.1 days in 2011 (Figure 11, Study III, figure 2).

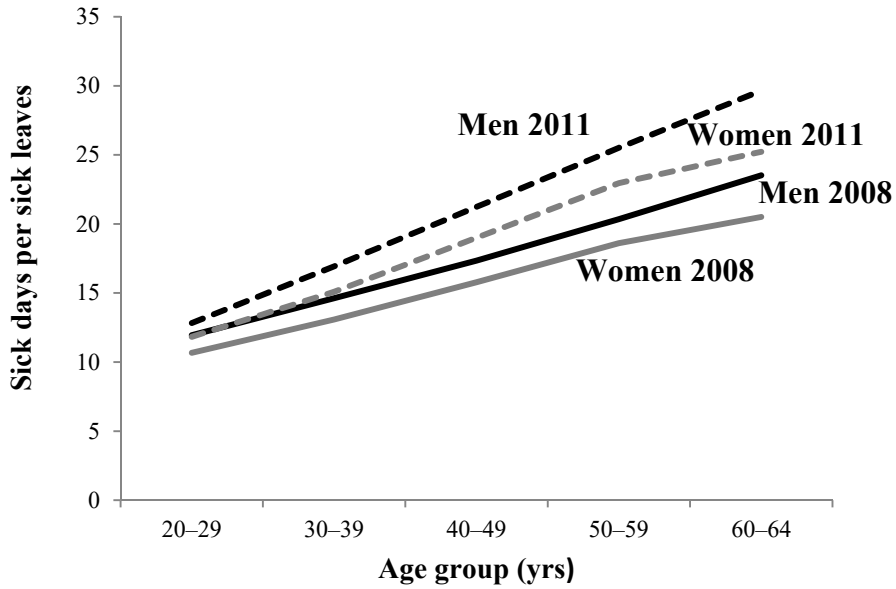

Figure 11. Duration of absence by age groups in men and women in Estonia, 2008 and 2011.
Men spend more time on sick leave than women and sick-leave episodes become longer in a positive correlation with age. Post-reform sick-leave episodes are longer than pre-reform episodes.

The mean number of sick-leave episodes per absentee was quite similar for both genders – 1.6 episodes in men and 1.62 episodes in women in 2008 and 1.42 episodes in men and 1.46 episodes in women in 2011.

Age
The youngest and oldest age groups showed higher absence than middle-age employees at the population level, but at the absentee level absence increased with age.

For both genders, the cumulative incidence and the frequency of sick leave were higher in 20–29-year-olds and 50–64-year-olds as compared to 30–49-year-olds (Figure 9, Figure 10).

The duration of absence was positively correlated with increasing age (Figure 11).

Socio-economic position
Blue-collar employees revealed higher absence both at the population and the absentee level.

The SA of blue-collar employees were characterized by greater length of absence (25.5 absent days per absentee in 2004–2008 and 24.7 in 2010) as

compared to white-collar employees (16.6 absent days per absentee in 2004–2008 and 15.8 in 2010) (Figure 12, Study II, table III).

The blue-collar group showed a higher SA rate, that is, absent days per employee, (12.9 days in 2004–2008 and 9.8 days in 2010) than the white-collar group (7.4 days in 2004–2008 and 6.5 in 2010) (Figure 12).

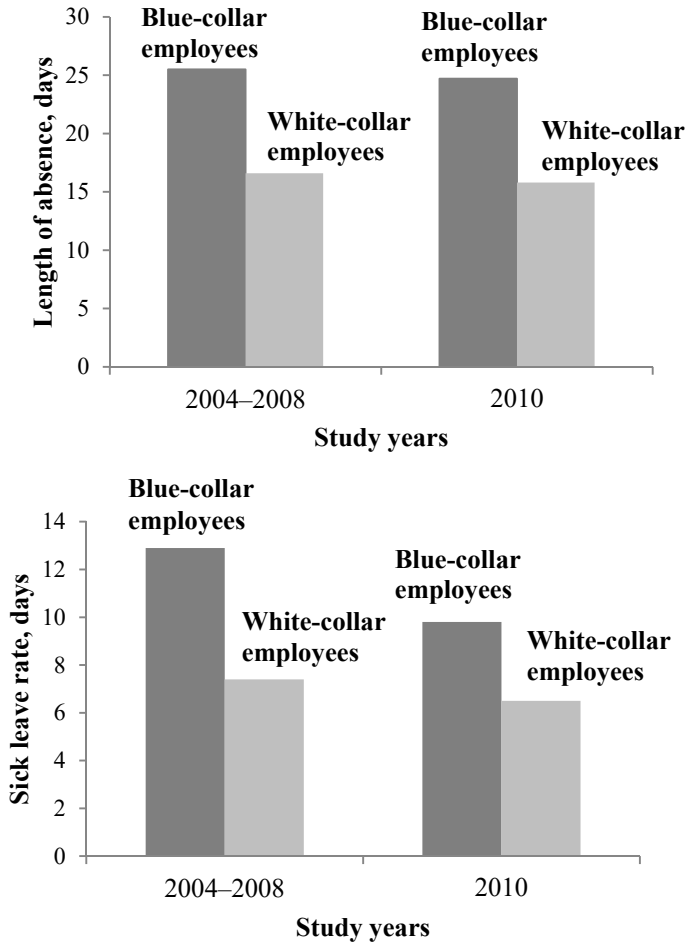

Figure 12. Length of absence and SA rate in Estonia, 2004–2008 and 2010.
Blue-collar employees have more absent days per absentee and per employee. The number of absent days per absentee remained unchanged in the post-reform year, but the number of absent days per employee decreased in the post-reform year in both socio-economic classes.

According to the distribution pattern of used sick days, the burden of SA was also higher among blue-collar employees – half of the blue-collar employees were absent up to 15 days per year whereas half of the white-collar absentees used less than 10 sick days a year. (Study II, figure 1,2).

The cumulative incidence was higher for blue-collar employees as compared to white-collar employees in 2004–2008, but it was equal in both socio-economic groups in 2010 (Study II, table II).

5.4. Influence of the sick-pay cut reform on sickness absence

General outcome

The main impact of the reform was that the number of sick-listed persons and sick-leave episodes decreased by one third. The total number of absentees decreased from 227 981 in 2008 to 152 102 in 2011; the annual total number of sick-leave days decreased by 29% from 5.87 to 4.19 million.

The chance of recurrent sick-leave was 0.84 times lower in the post-reform period than in the pre-reform period (95% CI 0.84–0.84, $P < 0.01$) (Study III table 2).

The proportion of recurrent sick leave changed significantly ($P < 0.01$) in favour of single sick leave (Figure 13). In the pre-reform period, the proportion of absentees who had used 1, 2 and 3 or more sick-leave episodes in a year was 62%, 24%, and 14%, respectively; after the reform the proportions were 70%, 21%, and 9%.

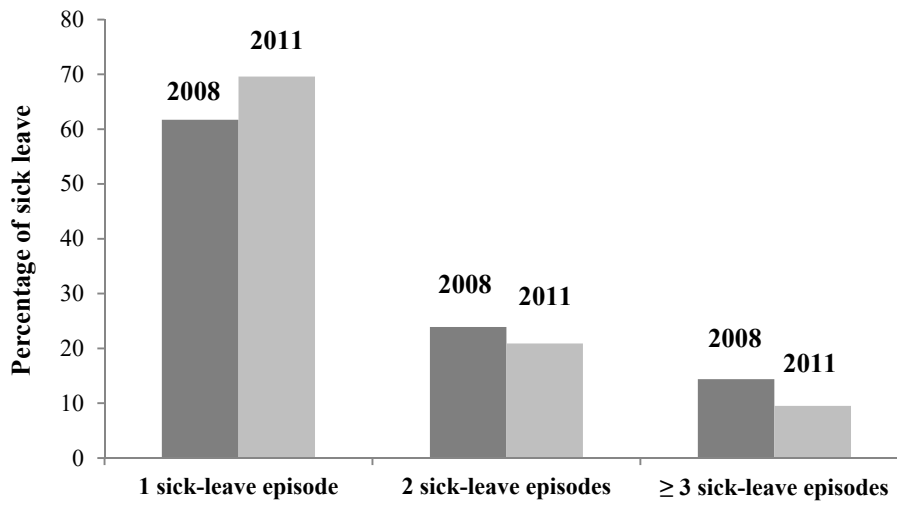

Figure 13. Recurrence of sick leave in Estonia, 2008 and 2011.
The vast majority of absentees use 1 sick-leave episode per year. In the post-reform period the proportion of single sick-leave episodes increased.

Most sick-leave episodes lasted for 4–20 days and the number of such sick-leave episodes decreased by half whereas the change in shorter and longer episodes was negligible (Study III, figure 2). Logistic regression analysis showed that the odds of medium-term sick leave in the post-reform period were 33%, 28%, and 9% lower for the 4–8, 9–20, and 21–30-day sick-leave episodes than those of short sick-leave episodes (Study III, table 2).

The mean duration of short sick leave, that is, 1–3 day sick-leave episodes, shortened from 2.5 days to 2.2 days ($P < 0.01$) and lengthened in episodes longer than two months from 92.9 to 97.4 days ($P < 0.01$). The mean duration of absence became longer (Figure 11).

Age and gender

SA rate, that is, the number of absent days per employee decreased from 8.8 in 2008 to 6.4 in 2011 for men and from 10.2 to 8.0 for women in the respective years but remained higher for women (Figure 8).

After the reform the frequency of sick leave decreased equally both in men (RR 0.62; 95% CI 0.62–0.63) and women (RR 0.66; 95% CI 0.65–0.66) and in all the age groups (Figure 11, Study III, figure 3).

Mean cumulative incidence, i.e. absentees per employee, also decreased after the reform and still remained higher for women (Figure 9).

After the reform sick-leave episodes became longer by 20%. For women the mean rate ratio was 1.20 (95% CI 1.20–1.20); for men it was 1.19 (95% CI 1.18–1.19). The mean duration of sick-leave episodes lengthened in a positive correlation with age (Figure 11, Study III figure 3). Based on logistic regression the odds for longer sick leave adjusted for age and gender were 1.01 higher in the post-reform period than in the pre-reform year (95% CI 1.01–1.01, $P < 0.01$) (Study III table 2) .

The extent of changes did not differ significantly between genders in the context of means of evaluated measures ($P = 1$).

Socio-economic position

After the reform, the proportion of blue-collar workers, who had been on sick leave, decreased from 51% to 40% ($P<0.001$) and among white-collar employees from 45% to 41% ($P = 0.026$) (Figure 18, Study II table II). Thus, though the blue-collar employees had shown a higher prevalence of absentees before the reform, after the reform the prevalence of absentees equalled among the different socio-economic groups.

In the multivariate logistic regressioon model the odds of lower SA in the post-reform period were highly significant only in blue-collar employees (OR 0.63; 95% CI 0.51–0.77, $P < 0.001$ vs OR 0.88; 95% CI 0.77–1.01, $P = 0.072$ in white-collar employees).

The SA rate declined considerably in both groups: in blue-collar employees by 24.6% – from 12.9 to 9.8 absent days ($P < 0.001$) and by 13.3% in white-collar employees – from 7.4 to 6.5 days ($P = 0.011$).

However, the length of absence did not change significantly in the population of blue-collar absentees ($P = 0.817$) or white-collar absentees ($P = 0.260$) (Figure 12, Study II, table III).

The distribution of annual sick days remained the same after the reform (Study II figure 1, Study II, figure 2). Half of the blue-collar employees were absent less than 15 days per year while half of the white-collar employees were absent less than 10 days per year in both study periods.

Among white-collar workers the decline of absentees was statistically significant only among those with good self-rated health ($P = 0.04$) (Table 6) while among blue-collar employees the decline was universal and it occurred both in men and women, in employees with good and poor self-rated health, and in employees with and without chronic disease.

The proportion of absentees among blue-collar employees with a low and very low income dropped significantly ($P < 0.001$ and $P = 0.021$) while the change was not significant for higher income persons. Also, the proportion of absentees declined significantly among 20–55-year-old blue-collar employees and not among older employees.

The odds of SA in employees with chronic disease or poor self-rated health were the same in the pre- and the post-reform period.

6. DISCUSSION

This thesis deals with the characterization of SA among the Estonian working population in the context of the sick-pay cut reform. Three different studies based on three datasets focused on this phenomenon. When the sick-pay cut reform was implemented in 2009, it was intended to curb public expenditure, to lower the EHIF costs on SA, to lower SA itself, and to motivate employers to improve working conditions and the environment.

While implementing the reform the questions about the effects of the reform on subgroups of employees and potential unintended consequences were not considered. These issues were studied retrospectively. Study I set the background and investigated the factors that influence SA. Studies II and III described the SA patterns, that is, who used sick days and how the sick days were used. These studies analysed how the SA reform affected the SA in general and in the subgroups.

6.1. Factors influencing sickness absence use

The main finding of this study was that SA risk factors other than current ill health were dissatisfaction with one's job and low education. Also, as expected, adverse health and presence of chronic disease were strongly associated with SA.

Primarily, SA is a measure of health (3,66). It is generally agreed that employees with poor self-rated health and presence of chronic disease, especially older persons, have an increased SA risk and higher SA rates (5,29,39,42,45,105–107). A large number of risk factors can influence the use of sick leave (97). Various studies of SA risk factors conducted at the organizational or population levels did establish associations between SA, such as a heavy manual job, low decision latitude at work, a high number of working hours, a high body mass index, depressive mood, low income, or smoking status (7,11,55,56,60,61,108,109). Such distinct SA risk factors can be more attributable to specific sub-populations and less to the entire population.

Most probably the higher risk for SA due to dissatisfaction with one's job has many potential underlying causes such as a physically demanding job, psychosocial stress, low income, or some other factors (60,110). Low education also embodies certain characteristics that influence SA behaviour: overweight, poor general health, heavy physical work, high work demands, low job control, and thus increase the SA risk (5,9,29,54,64,66,68–70,111). Thus, both dissatisfaction with one's job and low education can be considered as indicators that capture several risk factors represented in different sub-populations which are accumulated to these powerful SA risk factors universal for the entire population.

SA is associated with direct and indirect costs to the individual, employer, and society, namely the loss of productivity and a higher risk of disability

(30,41,42). Hence, both health-related and health-unrelated risk factors of SA should be acknowledged and managed at the appropriate level.

6.2. Sickness absence patterns in Estonian employees

Age and gender

The main SA patterns showed that at the population level SA was higher among women than men in Estonia, but SA at the absentee level was higher for men.

As far as the overall working population is concerned, women used more sick days (SA rate) and sick-leave episodes (frequency of sick leave) in a year, and more women than men were on sick leave (cumulative incidence). Their different health perception and susceptibility to work-related psychosocial risk factors, especially emotional demands could potentiate their higher absence (11,19,51,52,55). Although the SA at the population level was higher in women than in men, in the Estonian population the difference was smaller than in the Nordic countries or the UK where women's SA is 30–60% higher as compared to men (22,58).

Among sick-leave users, that is, at the absentee level, it was found that SA was higher in men – men were longer on sick leave irrespective of age (duration of absence). This seems to be characteristic of the Estonian population and different from previous research, which shows higher duration of absences for women (57,58). Higher absence in men has been found only in older age groups (54). The gender gap in poor self-rated health was not significant in the Estonian population as compared to the vast majority of European countries (112), and this may exert a stronger effect of riskier health behaviour of men on duration of absences. Some previous studies report also longer duration of absences for men, but there is lack of evidence on causality (45,51,59).

It is possible that higher duration of absence in men is more influenced by health problems than by SA behaviour. Riskier health behaviour of men in all age groups could lead to more serious health problems needing longer care. Among older men the higher absence shows the effect of serious chronic diseases. According to Estonian statistics, there was a 30% reduction in overall mortality among 50–64-year-old men in the years 2006–2012 (113). Thus, longer survival of men suffering from severe diseases could contribute to adverse health and consequently longer sick-leave episodes.

At the population level one could see U-shaped SA (frequency of absence and cumulative incidence) by the age groups in both genders. SA was equally high among employees of under 30 and over 50 years of age and low among middle-aged men and women. This could be explained by different SA behaviour of young, middle-aged, and older employees. Among young employees the large number of absentees and sick-leave episodes could occur for non-medical reasons, such as less strict norms in taking sick leave and poor commitment to work (2,6). Especially short-term absences and frequent episodes, which characterize the absence of young employees, tend to be related

to job dissatisfaction (6,10). Also, working in occupations where there is a possibility to take sick leave without reporting could influence the higher absences among younger workers. There is no reason to believe that the health of young employees could be as poor as in older employees because good and very good self-rated health in the population is highest among younger people and declines with age (113). Also, younger employees spend less time on sick leave; the proportion of working days lost due to SA is 1.5–2.3% in the youngest age group and 3.3–4.9% in the oldest age group.

At the absentee level the pattern was different – SA rose in a positive correlation with age, i.e. the higher the age, the longer were the sick-leave episodes. The overall trend that the burden of SA becomes higher with rising age is similar to most European countries (22,45,94).

To conclude, one could claim that the burden of SA in terms of lost working days and expenditures increases in parallel to age in both men and women.

Socio-economic position

Blue-collar employees and white-collar employees have different SA patterns. Blue-collar employees have higher absences at both the population and the absentee level; their SA rate was higher (absent days per employee) and absentees used more sick days per year.

These patterns can be explained with poorer health among the blue-collar population, also with adverse health behaviour and unfavorable working conditions as compared to higher grade occupational levels (2,6,8,9,70,71).

There was one exceptional trend in the population-level patterns. By comparison with white-collar employees the proportion of blue-collar absentees, especially in lower income groups, was higher in the pre-reform period, but on the same level in the post-reform period. This trend is discussed in the section about the influence of the reform on SA.

In conclusion, the SA patterns in Estonia are influenced by different health conditions and different SA behaviour of gender, age, and socio-economic groups. Based on a wide range of SA measures, these SA patterns are similar to those in other countries (2,11,19,22,45,51,55,94).

6.3. Impact of the reform on sickness absence

General trends

In budgetary terms the outcome of the sick-pay cut during the SA reform can be considered to be successful. The burden of SA among Estonian employees decreased remarkably – the total amount of sick leave, sick days, and the number of absentees dropped by one third and all the population level measures of SA decreased by 30% as well. The recurrence of sick-leave episodes and the number of medium-term sick-leave episodes decreased as well. The data suggests that moral pressure on the potential sick-leave users could be the driving force behind the SA decrease. It has been shown that the sick-pay cut itself and

the concurrent recession had a disciplining effect (74), which can be explained with the theory of reduced moral hazard among employees, that is, workers become more conscientious in harder times when job insecurity rises (73,79,82, 92,93,114,115). Most Estonian absentees used short- or medium-term sick-leave episodes, which include a large number of sick-leave episodes that after the reform were not compensated by social insurance but by employers. Thus, many employees may avoid taking sick leave due to fear of loss of earnings and losing their job and use sick leave only in the case of more serious illnesses (81). Reduction in the number of sick-leave episodes and recurrent sick leave also supports this opinion.

One can speculate that the disciplining effect is most visible among employees who were prior to the reform absent from work because of dissatisfaction with their job or have less strict norm sets (2). According to Johansson and Palme (94), the cost of absence for an employee rather than the unemployment rate causes the decrease in the SA rate.

One could expect the sick-leave episodes longer than a month to be not influenced by the reform in Estonia because according to some authors, the moral hazard has less importance in long-term absenteeism (81,92,93,95).

The biggest decrease was in the number of medium-term sick-leave episodes, which decreased by half, but the decrease in the number of short-term sick-leave episodes was small. Most probably the modest decrease in short-term episodes was a statistical effect – all employees but those with absences lasting more than a month reduced their absences after the reform. Thus, many potential short-term absences did not take place and many potential medium-term absences were cut down to short-term absences, that is, there was a shift to the left of shorter rather than long-term absences.

These results suggest that the benefit cuts change the sickness behaviour of employees, but the effect was heterogeneous.

Age and gender

The findings of the present thesis revealed no gender differences in the extent of changes in SA behaviour – men and women react to the sick-pay cuts similarly. Nevertheless, there are some differences in SA behaviour between the age groups. The odds for SA after the sick-pay cut show an increase among 60–64-year-old employees as compared to young employees. The most probable explanation is that younger employees restricted their use of sick-leave episodes more than older employees (80–82,95).

Paradoxically, the duration of post-reform sick leave prolonged by 20%, and the prolongation was in a positive correlation with age – the older the age, the longer are sick-leave episodes as compared to the pre-reform period. This finding could be a result of several different phenomena, but most probably it is a statistical effect, not a true correlation. Thus, the age-dependent increase in the duration of sick-leave episodes after the sick-pay cut is also due to the left-shifting trend as it was observed in changes of the number of episodes of different length. If the number of shorter absences decreases and the number of

longer absences does not, the absent days per sick leave tend to become longer. The fact that sick leave lengthens more with rising age, supports the explanation of left-shifting. As younger employees have less long-term sick-leave episodes, the left-shifting of sick days influences their mean duration of sick-leave episodes less, and with rising age, the number of long episodes rises due to poorer health and more serious chronic illnesses. Consequently, left-shifting has a bigger influence on the mean duration of sick-leave episodes.

Also, sick-leave episodes could become longer due to financial reasons. For example, if there is a risk of a new absence episode, which at the start has low or no compensation, then it will be more economical for the employee to stay longer on the current episode (72,79).

There is no evidence that prolonged duration of absences could happen due to deteriorated health of employees after the reform. From the literature it is known that sick-pay cuts had not influenced the employees' health in the short term (82). However, economic recession could provoke negative health effects (116,117), and because it coincided with the SA reform in Estonia, it could prolong SA episodes.

Most of the overall SA patterns in Estonia remained the same after the reform. At the population level SA (SA rate, frequency of sick leave, and cumulative incidence) was still higher in women and younger, as well as in the older age groups (frequency of sick leave and cumulative incidence); at the absentee level (duration of absence) SA was still higher in men and increased with age. Medium-term sick leave composed a vast majority of sick-leave episodes of different length, and a vast majority of absentees used one sick-leave episode a year. Blue-collar employees had higher SA than white-collar employees.

The finding that SA patterns are stable over time and were not influenced by substantial incentives shows a strong socio-cultural nature of these patterns.

Socio-economic position

The present study found that the lowering of SA after the reform was observed in both socio-economic classes. However, in blue-collar employees it was more pronounced among those with a low salary while in white-collar employees it was characteristic of those with good self-rated health.

It is noteworthy that before the reform in Estonia in 2009 the proportion of absentees was higher among blue-collar employees, but after the reform the proportion of blue- and white-collar absentees equalled. This is the single change in socio-economic SA patterns while all the other patterns show higher SA for blue-collar employees before and after the reform. Employees with low skills and a low income may experience more insecurity in employment protection than employees with higher skills. Potential loss of income and fear of dismissal hinders SA use in blue-collar employees, and in the long term, such sickness behaviour could have a negative influence on their health, i.e. the effect of worse health outcomes could be similar to that of delayed access to healthcare (118–121). Thus, in addition to health factors the SA behaviour of

blue-and white-collar employees is driven by different motivations. Loss of income drives the decisions of blue-collar employees, and moral hazard drives the decisions of white-collar employees. Whereas blue-collar employees are more vulnerable to monetary incentives, they may need even stronger protection in case of illnesses than white-collar employees.

Pre-reform trends in social security

At the time of the sick-pay reform there was a redistribution of the social insurance resources. Economic downturn and rising unemployment forced many employees with health problems to move to the disability schemes. It could be seen as an alternative social insurance option to sick leave benefits in the light of the sick-pay reform. The number of invalidity pensioners increased from 67 000 persons in 2008 to 77 000 in 2010 and continued to rise, reaching 97 000 in 2014 (Figure 4). Invalidity pension is a benefit that is paid to persons of the working age with permanent incapacity to work by the Social Insurance Board. Until 1 July 2016 the pension was assigned to persons with more than 40% of incapacity to work. Since July 2016 incapacity assessment and payment of pensions was totally reorganized. The fall of SA and its costs were accompanied by a remarkable increase in invalidity pensions. Though invalidity pensions had shown a rising trend even before the reform, the expenditure more than doubled from 2008 to 2014.

However, as the rise in disability benefit claimants had increased already before the sick benefit reform and continued to rise after it, it is more plausible that moving to a disability scheme was driven by financial decisions related to rising unemployment and has minimal association with the sick-pay reform. This explanation is also supported by the fact that the number of disability pensioners rose mostly in the regions with the highest unemployment. It is fully possible that some conscious substitution of tightened temporary sickness compensation for more favourable permanent disability insurance took place. Yet, one might claim that the sick-pay reform itself did not force the shift considerably as the number of long-term absences, that is, absences of more sick persons who would have been approved for disability, did not change much after the reform.

6.4. Strengths and limitations

Considering the advantages, first, the EHIF dataset in Study III comprises all the Estonian employees aged 20–64 who had used sick leave in the years 2008 and 2011. It means that the analysis concerned all the active labour force. Also, unlike many other European countries, all the sick-leave episodes, whether compensated by the Estonian National Health Insurance Fund or employers, or the non-compensated waiting days, are reflected in national statistics. Such a registration regime ensures greater value to the use of SA measures in order to analyse the SA trends.

Second, the person-level data, apart from the aggregated data, allows calculation of sick-leave measures both at the employee and at the absentee levels.

Third, differently from several countries, sickness insurance in Estonia is solidarity-based, and equal conditions in SA payment are applied to all employees. For this reason, the SA behaviour of blue- and white-collar employees was assessed on an equal basis.

Finally, the use of different datasets, officially registered sick-leave data as well as the self-reported sick leave data, are complementary to support the conclusions arising from the studies, as it enables a more integral picture of SA than it would be possible by using only one dataset.

There are some limitations to the present study.

Since the study of the impact of the sick-pay cut on the use of SA was conducted in a relatively short time after the reform, when adaptations of sickness behaviour to the new regulation were incipient, it was possible to assess only the short-term effects of the reform. Thus, one can not say which of the effects of the reform are temporary and which are lasting.

Because of the cross-sectional study design it was possible to evaluate the associations and prevalence of the results of interest in the context of changed SA compensation policy in Studies II and III and assess the associations between SA and its risk factors in Study I. However, it was impossible to assess the causality of the outcome. Nor it was possible to distinguish between the influence of economic downturn and SA policy change on the observed post-reform changes in sick-leave use. Thus the results of Studies II and III were presented without attributing the separate impact of each modifier to the outcome, bearing in mind that both recession and the reform could have influenced the observed changes.

Study II used self-reported SA data, which is considered less accurate than register-based SA data (95,122). At the same time, self-reported data had some advantages. The dataset possibly included information, which can not be obtained from register-based data, such as the sick days taken in agreement with the employer without official certification. Also, this dataset included valuable information about self-perceived health.

6.5. Lessons learned

The present thesis identified the patterns of SA use and assessed the influence of the sickness benefit reform on SA behaviour of different population groups. Below are the main aspects which may be of interest to policymakers.

Generally, the trends of changes in SA behaviour are similar to those described in earlier studies showing an extensive decline in overall SA, a heterogeneous effect on different sub-populations, and no influence on long-term absences after the economic incentives to control absence (21,72,79,81,82,94).

The sickness benefit reform had mainly a disciplining effect on SA use. However, the policymakers and parties whose responsibility is to shape sick-

pay procedures and pay SA compensation have to work on strategies which would avoid negative health consequences and poverty risk of employees who are sensible to the loss of income or are long-term absentees. As the blue-collar employees pose a higher risk due to lower socio-economic status, their protection in case of sickness deserves increased attention.

It is remarkable that the extent of SA decrease after the implementation of stricter rules for SA compensation seems to be similar in different countries irrespective of the magnitude of changes. Lowering of the SA by one quarter to one third after the sick-pay reform was also achieved in Sweden, Germany, and Italy though the implemented changes were less radical than in Estonia (21,72,82,95). Thus, the actions to achieve the results must be thought through and must take into account the vulnerability of different sub-populations.

SA patterns and measures provide information about SA behaviour and health situation of the working population. It is suggested that the SA measures should be monitored continuously in order to find out how the SA behaviour and health of employees change over time and which societal events influence them, for instance, national disease prevention or health behaviour programmes, changes in health service provision, downsizing, or any monetary incentives affecting employees. Knowing the evolution of national SA patterns allows handling SA in the desired way. For instance, high SA rates among young employees could be modified by educational intervention. Men's longer sick leave, in the Estonian case, could be modified by promoting their health behaviour and treatment intention.

Several questions remain for further research: how long will SA remain at a low level, how do the different age, gender, and socio-economic groups adapt their SA behaviour in the longer term, and what is the health outcome of employees who avoid using sick leave due to financial reasons. Also, if and how the goal of the reform was achieved regarding the motivation of employers to improve working conditions, and the environment contributing to lower SA? To answer these questions, more research is needed.

7. CONCLUSIONS

1. Risk factors for SA in Estonian employees included chronic disease, poor self-rated health, dissatisfaction with one's job, and lower education. Both non-health-related factors capture several sole risk factors of SA, such as a physically or psychologically demanding job and adverse health behaviour.
2. The majority of SA patterns in the Estonian population, i.e. the way how SA was used, were stable despite the change in the sick-pay policy. At the population level, SA was higher among women; younger and older employees used more sick leave than middle-aged people. At the absentee level absence was higher among men than among women and higher among blue-collar employees as compared to white-collar employees. The older the age, the longer were the absences.
3. The sick-pay cut reform, implemented in Estonia in 2009, lowered the use of sick leave remarkably – the total number of sick days and absentees decreased by one third, which makes the reform successful in financial terms.
4. The cuts in sickness benefits had an uneven impact on blue- and white-collar employees. Low-salaried blue-collar workers decreased their SA more than the other groups. This can be considered as a negative outcome of the reform because economically vulnerable employees reduced the use of sick leave probably due to financial reasons. Decreased possibility to take sick leave can be a health risk in the longer term.
5. Monetary incentives do not affect the use of sick leave of seriously ill employees.
6. The decrease in SA after the implementation of stricter rules for SA compensation in Estonia in 2009 was similar to that in other welfare countries irrespective of the magnitude of the implemented changes.

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SUMMARY IN ESTONIAN

Haiguse tõttu töölt puudumine Eestis: mõjurid ja töövõimetuslehtede hüvitamise korra muudatuste efekt

Sissejuhatus

Haiguse tõttu puudumisena (HTP) mõistetakse ajutist töölt ärajäämist juhul, kui inimene ei saa haigestumise tõttu oma tasustatavat tööd jätkata, ehk, nö haiguslehel olemist. Haiguse tõttu puudujate all on käesolevas töös mõeldud haiguslehtede kasutajaid. HTP mustrite all on mõeldud HTP eri aspekte, mis iseloomustavad seda, mil viisil HTP ühiskonnas esineb.

Aktiivselt tööelus osaleva töötaja sotsiaalne kaitse haigestumise korral on tänapäeval üks inimõigustest (15). Suurem osa riikidest on oma töötajatele taganud haiguspäevade tõttu saamata jäänud tulu kompenseerimise tasustatud haiguslehtede näol, kuid hüvitamise tavad on äärmiselt varieeruvad (16). HTP-l on kaks aspekti: inimese õigused ja kohustused. Ühest küljest ei ole haige inimene vastutav haigestumise eest ja tal on õigus haigestumise korral tööst kõrvale jääda, teisalt on tal kohustus suhtuda haigestumisesse kui mittesoovitavasse olukorda ja vähendada oma haigeolemist nii suurel määral kui võimalik (1).

Üksikinimese tasandil mõjutavad haiguslehtede kasutamist lisaks käesolevale haigestumisele ka individuaalsed, töö ja tervisega seotud olud, näiteks vanus, sugu, sissetulek, töö iseloom, krooniliste haiguste olemasolu. Riigi tasandil mõjutab HTP-d rahvastiku demograafiline ja majanduslik olukord, töökeskkond ja tööturu muutused ning kehtiv kindlustussüsteem (2–12). Üldisi HTP trende jälgides on täheldatud, et majanduslanguse ajal töövõimetuslehtede hulk väheneb. Sealhulgas on HTP negatiivses korrelatsioonis töötusega: kui töötus suureneb, siis HTP väheneb. See võib olla tingitud nii inimeste endi käitumisest – nad on enam distsiplineeritud tööl käima, kui ka tööjõukoosluse muutusest – kogenumad või tugevama tervisega töötajad jäävad tööturule püsima ning uute töötajate värbamisel välditakse suurema HTP riskiga töötajate töölevõtmist.

Eestis on kõigile ravikindlustatud töötavatele inimestele ajutise töövõimetuse tekkimise korral tagatud rahaline hüvitis. See on kompensatsioon, mida töövõimetuslehe alusel makstakse kindlustatud isikule, kellel jääb ajutise töövabastuse tõttu saamata sotsiaalmaksuga maksustatud tulu. HTP korral on hüvitise eesmärk tagada inimesele sissetulek ajaks, mil ta ei ole ajutise töövõimetuse tõttu võimeline tavapärase sissetuleku saamiseks töötamist jätkama. Ajutist töövõimetust hüvitatakse haigestumise, hooldamisvajaduse, sünnituse ja lapsendamise korral.

Kuni 2009. aasta 1. juulini maksis kõik töövõimetushüvitised Haigekassa. Majanduse kasvades suurenes töötavate kindlustatute arv, sotsiaalmaksu laekumine ja keskmine brutosissetulek, mis tõi loomuliku jätkuna kaasa töövõimetuspäevade arvu ja töövõimetushüvitiste suurenemise. Kuid lisaks oli täheldatav töövõimetuspäevade arvu pidev suurenemine kindlustatu kohta ning haigekassa

kulude hulgas töövõimetushüvitiste osakaal järjest kasvas. Aastatel 2003–2008 suurenesid töövõimetushüvitistena väljamakstavad kulud 15–25% aastas. 2008. aastaks ulatus töövõimetushüvitiste kogusumma 94 miljoni euroni moodustades 12% kogu tervisekindlustusele kuluvast rahast. Seoses majanduslanguse ja negatiivse riigieelarve vastuvõtmisega otsustati ühe tasakaalustava meetmena muuta töövõimetuslehtede kasutamise ja hüvitamise korda (lühidalt nimetatud reformiks). Kõige suuremad muudatused rakendusid haiguslehtedele ehk töötaja enda haigestumise tõttu kasutatavale tööst vabastusele. 2009. aasta 1. juulist pikendati ooteaega, s.o hüvitamata haiguspäevi, endiselt ühelt päevalt kolmele, lisandus tööandja kohustus maksta oma töötajate haigushüvitised 4.–8. haiguspäevani; alates 9. haiguspäevast endise 2. päeva asemel võttis hüvitise maksmise üle Haigekassa. Reformi tulemusel langesid töövõimetushüvitiste kulud 33 miljonile eurole, haiguspäevade koguhulk vähenes 6,35 miljonilt haiguspäevalt aastal 2008 3,6 miljonile haiguspäevale aastal 2010 (96).

Tasakaalu leidmine haiguslehtede kasutamise ja mõistliku hüvitamise vahel on katsumuseks nii valitsustele, tööandjatele kui ka töötajatele. See on ka ärgitanud uurima HTP mõjureid (2,20,22,23,25,26).

Teaduskirjanduses on soovitatud HTP hindamiseks kasutada viit nn epidemioloogilist näitajat, et tagada HTP andmete parem rahvusvaheline võrreldavus ning riigisiseselt saada ülevaade HTP eri aspektide kohta. Rahvastiku tasandil hindamise näitajad – haiguse tõttu puudujate osakaal rahvastikus (*cumulative incidence*), haiguslehtede hulk töötaja kohta (*frequency of sick-leave*) ja haiguslehtede arv haigusvabade päevade kohta (*incidence rate*) – iseloomustavad HTP ulatust ja esinemist töötava rahvastiku seas ning võimaldavad hinnata suurte sündmuste, nt epideemiad, majandussurutis, üleriigilised ennetusprogrammid, mõju tervisele.

Haiguse tõttu puudujate tasandil hindamise näitajad – haiguspäevade arv haiguse tõttu puuduja kohta (*length of absence*) ja haiguspäevade arv haiguslehtede kohta (*duration of absence*) – iseloomustavad haiguslehtede kasutajaid. Kui suhtuda haiguslehe kestusesse ja haiguspäevade hulgasse kui haiguse raskuse näitajatesse, saab nende näitajate abil hinnata näiteks töötava rahvastiku terviseseisundit või mingi kindla tunnuse põhjal huvipakkuvate rahvastikurühmade käsitluse muutuse tulemuslikkust.

Nimetatud näitajate kasutamine eeldab kindlate andmete kogumist ja kättesaadavust: kogu töötava rahvastiku arv, haiguse tõttu puudujate arv, haiguspäevade arv, haiguslehtede arv, haiguslehtede alguse ja lõpu kuupäevad, mis võimaldavad käsitleda ühel aastal alanud ja teisel aastal lõppenud haiguslehti kindlal kokkulepitud viisil.

Uurimistöö eesmärgid:

1. hinnata millised tervise-, töö- ja sotsiaalmajanduslikud HTP riskitegurid lisaks käesolevale haigestumisele on seotud HTP-ga Eesti töötajatel;
2. selgitada välja HTP seaduspära töötava rahvastiku hulgas ja haiguse tõttu puudujate hulgas;
3. hinnata haiguslehtede hüvitamise korra muutuse mõju HTP eri aspektidele.

Uurimistöö andmed ja meetodid

Uurimistöös on andmeallikatena kasutatud Eesti Terviseuuringut 2006 (I artikkel), Eesti Täiskasvanud Rahvastiku Tervisekäitumise uuringut aastatest 2004, 2006, 2008 ja 2010 (II artikkel) ja Eesti Haigekassa 2008. ja 2011. aastal registreeritud haiguslehtede andmeid (III artikkel).

Eesti Terviseuuring 2006 oli üleriigiline küsitlusuuring, mis kattis mitmeid tervise- ja sotsiaalmajandusliku tausta aspekte. Uuring hõlmas 15–84-aastast Eesti alalist rahvastikku. Valimi maht oli 11 023 inimest, vastamismäär 60,2%; seega saadi uuringuandmed 6434 inimese kohta. Käesolevasse uuringusse valiti 2941 inimest, kes intervjuu ajal töötasid, kelle vanus oli 18–64 aastat, ning HTP-st teati: uuringus oli küsimus sõnastatud "Kas olete praegu või olete viimase 4 nädala jooksul olnud töövõimetuslehel?".

HTP riskitegurid jagati vastavalt kirjanduse soovitustele kolme rühma: individuaalsed, tervisega seotud ja tööga seotud (97).

Individuaalsetest riskiteguritest kasutati soo, vanuse, abielu/kooselu, haridustaseme, tegevusala, kehamassi indeksi, suitsetamise ja kehalise aktiivsuse andmeid.

Tervisega seotud riskiteguritest kasutati andmeid tervise enesehinnagu, krooonilise/pikaajalise haiguse ja depressiooni kohta.

Tööga seotud riskiteguritest valiti tööga rahulolu, töökeskkonna füüsiliste ja vaimsete riskitegurite ja töötundide andmed.

Kõik tegurid peale sissetuleku jaotati kahte rühma: vanus alla 50 eluaasta või üle, haridus kuni 12 aastat või enam, kehamassi indeks kuni 30 kg/m^2 või enam, ametiala kas valge- või sinikrae (vastavalt ISCO klassifikatsioonile (103), kus ametiala kood 1–5 tähistas vastavalt valgekraed ja kood 6–9 tähistas sinikraed). Tervise enesehinnag jagati heaks, vastuste "hea" ja "väga hea", ja halvaks, vastuste "keskmine", "halb" või "väga halb" alusel. Depressiivsuse hindamisel kasutati depressiivsete sümptomite summat, lõikepunktiks määrati 12 (104). Töötunnid jagati kas ≤40 või >40 tunni nädalas, töökeskkonna füüsiliste ja vaimsete riskiregurite olemasolu määrati kummagi kohta nelja "jah"/"ei" küsimuse summa alusel: kui neljast küsimusest kaks olid vastatud "jah"-vastusega, siis kinnitati riskiteguri olemasolu. Isikliku kuupõhise sissetuleku alusel jagati vastajad nelja rühma: kalendrikuus <280 euro, 280–415 eorot, 416–626 eurot ja >626 euro saavad töötajad.

HTP ja määratletud riskitegurite seoste analüüsimiseks kasutati esmalt logistilist regressioonanalüüsi iga tunnusega eraldi. Seejärel viidi läbi mitmene logistiline regresioonanalüüs tunnustega, mille puhul esialgses analüüsis saadi statistiliselt oluline ($p<0,05$) seos HTP-ga; vanust kasutati seekord pidevmuutujana.

HTP seaduspära leidmiseks ja reformi mõju hindamiseks eri sotsiaalmajandusliku taustaga töötajatel kasutati Eesti Täiskasvanud Rahvastiku Tervisekäitumise uuringu andmeid. Uuring toimub postiküsitlusena üle-eestiliselt igal paarisaastal alates 1990ndast aastast ja võimaldab jälgida ning analüüsida tervisekäitumist iseloomustavate näitajate muutumist pikema aja vältel. Juhuvalimisse võetakse 5000 isikut vanuses 16–64 aastat. Vastamismäär aastatel

2004–2010 oli vahemikus 59,2–63,4%. HTP uuringus kasutati reformieelse perioodi valimina 2004., 2006. ja 2008. aastal vastanud isikuid, reformijärgse valimina 2010. aastal vastanud isikuid. Kokku oli sel perioodil vastanuid 11 969. Lõpliku valimi moodustasid 20–64-aastased isikud, kes olid tööhõives, kelle kohta oli olemas info HTP ja ametialase klassifikaatori alusel sotsiaalmajanduslikku klassi kuuluvuse kohta. Reformieelne valim koosnes 5674 isikust, reformijärgne valim 1775 isikust.

Valim jaotati valge- või sinikraedeks; HTP-d hinnati kummaski valimis eraldi.

HTP-na käsitleti oma haiguse tõttu nii haiguslehega kui -leheta töölt puudutud haiguspäevade arvu viimase 12 kuu jooksul.

HTP seaduspära kirjeldati epidemioloogilisteks uuringuteks soovitatud HTP näitajate alusel, s.o haiguspäevade arv haiguse tõttu puudujate kohta ja haiguse tõttu puudujate arv kõigi töötajate kohta (49). Lisaks on seaduspära kirjeldatud aastase haiguspäevade jaotuse ja HTP riskitegurite – kroonilise haiguse olemasolu, tervise enesehinnag, sissetulek ja vanus – alusel.

Reformi mõju HTP-le hinnati HTP riskitegurite levimusmäärade erinevuse ja mitmese logistilise regressiooni abil leidmaks seost HTP ja riskitegurite vahel enne ja pärast reformi. Selleks, et määrata, kuivõrd HTP seaduspära enne ja pärast reformi erines, kasutati Wilcoxoni testi. Aastast haiguspäevade hulka vaadeldi kumulatiivse jaotusena enne ja pärast reformi.

HTP seaduspära leidmiseks ja reformi mõju hindamiseks töötava rahvastiku ja haiguse tõttu puudujate seas kasutati Eesti Haigekassas aastatel 2008 ja 2011, s.o aasta enne ja kaks pärast reformi, registreeritud haiguslehtede andmeid. Andmestik koosnes kõikidest Eestis registreeritud töövõimetuslehtedest. Uuringusse valiti 20–64-aastaste oma haigestumise tõttu haiguslehte kasutanud isikute, 227 981 inimest aastal 2008 ja 152 102 inimest aastal 2011, andmed: sugu, vanus, haiguslehe alguse ja lõpu kuupäevad, mis võimaldas hinnata haiguslehtede seaduspära ja kasutamise muutust epidemioloogiliste näitajate ja soo ning vanuse alusel. Kogu töötava rahvastiku arvuna kasutati Statistikaameti andmeid vastavate aastate kohta.

Rahvastiku ja haiguse tõttu puudujate tasandil hinnati seaduspära vastavalt epidemioloogilistele näitajatele: haiguse tõttu puudujate osakaal rahvastikus, haiguslehtede arv töötaja kohta ja haiguspäevade arv haiguslehtede kohta. Neile lisaks reformi eeldatavatest tulemustest lähtuvate näitajate alusel: eri kestusega haiguslehtede arv ja haiguslehtede kordused ning HTP määr, ehk haiguspäevade arv töötaja kohta. Eri pikkusega haiguslehtede arv oli jagatud 1–3, 4–8, 9–20, 21–30, 31–60 ja üle 60 päeva kestnud lehtedeks, eristades sealhulgas 1–3-päevaseid lehti, mida reformijärgselt ei kompenseerita ja 4–8-päevaseid lehti, mida reformijärgselt hüvitavad tööandjad.

Reformijärgset muutust HTP-s hinnati soo ja vanuse järgi epidemioloogiliste näitajate ja üldisel tasandil eri pikkusega haiguslehtede ja ning nende korduse järgi. Tulemused esitati kordajate suhte (*rate ratio*) ja šansisuhtena (*odds ratio*) 95% usalduspiiridega (95% CI).

Analüüsimisel kasutati R-programmi ja selle analüüsipaketti „Epi“.

Tulemused

Eesti Terviseuuringu 2006 alusel on Eesti töötajatel lisaks käesolevale haigestumisele HTP riskiteguriteks halb tervise enesehinnang, kroonilise haiguse olemasolu, madal haridustase ja tööga rahulolematus.

HTP seaduspära ja reformijärgsete muutuste hindamise uuringutes toodi välja võrreldud valimite iseloomustused. Sini- ja valgekraede esindatus töötajaskonnas oli erinev: sinikraed moodustasid valimist ühe kolmandiku (n=1987 ajavahemikus 2004–2008 ja n=528 aastal 2010), valgekraed kaks kolmandikku (n=3687 ajavahemikul 2004–2008 ja n=1247 aastal 2010), üle 60% sinikraedest olid mehed, 70% valgekraedest olid naised, vanuseline jaotus oli sarnane. Eesti Haigekassa andmete põhjal moodustatud 20–64-aastaste haiguse tõttu puudujate valimis oli 2008. aastal 105 307 meest (33,1% meestöötajatest) ja 122 674 naist (40,8% naistöötajatest) ning 2010. aastal 67 508 meest (23,1% meestöötajatest) ja 84 594 naist (29,7% meestöötajatest); sooline jaotus ja keskmine vanus olid valimites sarnased. Töötava rahvastiku arv langes vähem (7%) kui haiguse tõttu puudujate arv (33%).

Eesti eelis võrreldes mitmete riikidega, kus tööandjate hüvitatavad haiguslehed riiklikus statistikas ei kajastu, on see, et Eesti Haigekassas registreeritakse kõik haiguslehed alates esimesest haiguspäevast olenemata nende hüvitamise staatusest. Niisugune registreerimise kord annab HTP näitajate kasutamisele HTP ajatrendide analüüsimiseks suurema kasutusväärtuse.

HTP seaduspära hindamisel leiti, et töötava rahvastiku tasandil oli haiguslehtede kasutajate osakaal naiste hulgas suurem kui meestel, samuti oli naiste haiguspäevade ja haiguslehtede arv suurem kui meestel. Haiguslehtede kasutamisel esines U-kujuline jaotus: haiguslehtede arv oli suurem noorte ja vanemate töötajate seas võrreldes keskealistega. Samal ajal oli haiguspäevade arv positiivses korrelatsioonis vanusega: mida kõrgem vanus, seda rohkem haiguspäevi.

Haiguse tõttu puudujate tasandil oli HTP suurem meeste seas: mehed olid keskmiselt kauem haiguslehel (16,2 päeva aastal 2008 ja 19,3 päeva aastal 2011, naistel vastavalt 15,1 ja 18,1 päeva) ja kasutasid enam haiguslehti kui haiguse tõttu puudujatest naised.

Võrreldes sini- ja valgekraede HTP-d selgus, et sinikraed kasutasid rohkem haiguspäevi: haiguspäevade hulk haiguse tõttu puuduja kohta oli neil 9 päeva võrra suurem, vastavalt 25 ja 16 päeva.

Üle 60% haiguse tõttu puudujatest kasutas üht haiguslehte aastas, valdav osa haiguslehti oli kestusega 4–20 päeva.

Reformijärgselt jäi HTP seaduspära sarnaseks reformieelsetele. Ainuke muutus oli see, et kui reformieelselt oli sinikraede hulgas 51% haiguslehtede kasutajaid ja valgekraede hulgas 45%, siis pärast reformi haiguse tõttu puudujate osakaal võrdsustus, vastavalt 40% ja 41%.

Reformijärgne muutus HTP-s oli väga suur. Haiguse tõttu puudujate koguarv vähenes 33%, haiguslehtede arv 40% ja haiguspäevade arv 29%.

Reformijärgselt vähenes haiguse tõttu puudujate osakaal statistiliselt olulisel määral nii sini- kui valgekraede hulgas. Hinnates HTP langust lähtuvalt riskiteguritest ilmnes, et sinikraede hulgas vähenes HTP kõigil, sissetuleku alusel

vaid madalapalgalistel sinikraedel, samas valgekraede hulgas ainult nendel, kellel oli hea tervise enesehinnang.

Uuringu tulemused näitasid, et šanss kasutada haiguspäevi oli 6% väiksem töötuse määra 1% suurenedes (OR=0,94; 95% CI 0,90–0,99, *P*=0.025).

Rahvastiku tasandill vähenes haiguspäevade arv töötaja kohta kahe päeva võrra: 8,8-lt 6,4-le meestel ja 10,2-lt 8,0-le naistel, vastavalt 2008 ja 2011. aastal. Haiguspäevade hulk ühe haiguse tõttu puuduja kohta aga pikenes 7% ja haiguspäevade arv haiguslehe kohta pikenes 20%. Tõenäoliselt on tegemist statistilise fenomeniga, kus reformijärgselt mittemuutunud pikkade haiguslehtede hulga arvel on suurenenud haiguspäevade keskmine arv. Haiguslehed pikenesid positiivses korrelatsioonis vanusega.

Muudatuste ulatus oli naistel ja meestel võrdne: nii naised kui mehed muutsid oma haiguskäitumist samal määral.

Mitmene logistiline regressioonanalüüs näitas, et šanss haiguslehtede pikenemisele suurenes 1% võrra (OR=1,01; 95% CI= 1,01–1,01; *P*<0,01). Haiguslehtede korduvkasutamise šanss vähenes 16% võrra (OR=0,84; 95% CI= 0,84–0,84; *P*<0,01). Võrreldes 1–3 päeva kestvate haiguslehtede kasutamisega vähenes 4–30 päeva kestvate haiguslehtede arv ja suurenes üle 31 päeva kestvate lehtede arv; suurenes üle 60 aasta vanuste haiguse tõttu puudujate hulk võrreldes alla 30-aastastega.

Järeldused

1. HTP olulised riskitegurid Eesti töötajatel olid halb tervise enesehinnang, kroonilise haiguse olemasolu, madal haridustase ja tööga rahulolematus. Mõlemad tervisega mitteseotud tegurid hõlmavad mitmeid riskitegureid, sh kehaliselt või vaimselt kurnav töö ja ebasoodus tervisekäitumine.
2. HTP seaduspärasused olid ühiskonnas püsivad ega muutunud pärast töövõimetuslehtede kasutamise ja hüvitamise uue korra rakendumist, ehk haiguslehtede kasutamist mõjutavat sekkumist: rahvastiku tasandil oli HTP suurem naistel, haiguse tõttu puudujate tasandil suurem meestel. Noored inimesed kasutasid rohkem haiguslehti võrreldes keskealistega, haiguslehtede kestused suurenesid vanusega; sotsiaalse positsiooni alusel vaadelduna olid sinikraede haiguslehed märkimisväärselt pikemad kui valgekraedel.
3. Töövõimetuslehtede kasutamise ja hüvitamise korra muutmise (reformi) tulemusel saavutati HTP suur langus: haiguse tõttu puudujate koguarv ja haiguspäevade koguarv langesid kolmandiku võrra, mistõttu võib reformi pidada edukaks. Märkimisväärselt muutus töötajate haiguskäitumine: haiguslehele jäädi vähem, korduvaid haiguslehti kasutati harvem. Sellist reaktsiooni reformile kirjeldatakse kui reformi distsiplineerivat efekti.
4. Reformil oli eri sotsiaalsel positsioonil olevatele töötajatele erinev mõju. Madalapalgalised madalamal sotsiaalsel positsioonil olevad töötajad vähendasid HTP-d kõige enam. Seda võib pidada reformi negatiivseks mõjuks, sest tõenäoliselt oli sinikraede HTP oluline langus suures osas tingitud majanduslikest põhjustest: kartusest sissetuleku vähenemise ja töökoha kao-

tuse ees, ning vähem reformi distsiplineerivast efektist. Piiratud võimalus kasutada haiguslehte võib tulevikus avaldada ebasoodsat mõju tervisele.
5. Rahalised mõjutusmeetodid ei mõjuta tõsiselt haigete töötajate haiguslehtede kasutamist.
6. Reformi mõju HTP-le on võrreldav teistes riikides reformidega saavutatud tulemustega, kuigi reformi ulatus ja HTP riiklik korraldus võivad olla väga erinevad.

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PUBLICATIONS

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Arendus- ja nõustamistegevustes osalemine, sh eriala arengukava koostamine (2012), töövõime hindamise metoodika väljatöötamine EV Sotsiaalministeeriumi algatatud Töövõimereformi raames (2013–2015, töörühma juht).

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