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## Educational differences in years of working life lost due to disability retirement

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**Background:** To assess the contribution of disability retirement on lost working years, we calculated the length of time spent on disability pension in various diagnostic groups by the level of education over the past 10 years, during which time the incidence of disability retirement has sharply decreased in Finland. **Methods:** The expectancy for time on disability pension due to mental disorders, musculoskeletal diseases, cardiovascular diseases and other diseases at age groups 25–63 was calculated using the Sullivan method based on nationwide register data for 2005–2014. The effect of the rise in overall education levels was estimated using counterfactual analysis. **Results:** Time spent on disability pension differed widely between educational groups. People in lower educational groups spent more time on disability pension due to all diagnoses and musculoskeletal diseases in particular. Time spent on disability pension decreased in all educational groups over time. In 2014, primary educated men were expected to spend 2.67 years on disability pension, compared to 0.57 years for higher tertiary educated men. The figures for women were closely similar. Educational differences in time spent on disability pension due to somatic diseases decreased over time, whereas the opposite was true for mental disorders. The reduced amount of time spent on disability pension was explained in part by the rise in overall education levels. **Conclusions:** Time spent on disability pension due to somatic conditions has decreased in all educational groups. Educational differences in time spent on disability pension are increasingly attributable to mental disorders.

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### Introduction

The population is continuing to age across Europe, driving up the number of retired people compared to the number available to work.<sup>1,2</sup> In response, many countries have raised their official retirement age.<sup>3</sup> However, in order to keep the current level of social security and welfare standards, it is equally important to maintain a high employment rate in the working age population. A key component that reduces the participation in working life is disability retirement. Yet, the contribution of disability retirement on lost working years has been scarcely studied.

The incidence of disability retirement is much higher in lower occupational and educational groups,<sup>4–8</sup> which may cause marked socioeconomic differences in the number of working years lost due to disability. A Spanish study found that the median of lost working years due to non-work related permanent disability was 9.6 years. Women lost more working years than men, and unskilled manual and non-manual workers lost more years than skilled employees.<sup>9</sup> In Finland, a previous study found that upper non-manual employees aged 50 were expected to spend 0.7 years on disability pension, while the corresponding figure for male manual workers was 2.7 years and for female manual workers 2.8 years.<sup>10</sup>

Many countries have reported marked changes over time in the incidence of disability retirement.<sup>11</sup> In Finland, the incidence of disability retirement increased until the early 2000s and then began to decline. The incidence of disability retirement due to mental disorders has fallen more sharply than that due to other causes, and musculoskeletal diseases have now regained their position as the most common cause of disability retirement.<sup>12</sup> However, because disability retirement due to musculoskeletal diseases often occurs at a relatively high age, its contribution to lost working years probably is smaller than for other diagnostic groups. A Norwegian study showed that although musculoskeletal disorders were the most common cause of disability retirement,

mental disorders accounted for more lost working years than musculoskeletal disorders.<sup>13</sup> Apart from the changes seen in the incidence of disability retirement, it is also noteworthy that the overall education level in the working age population has increased over time.<sup>14</sup> However, it remains unclear just how these changes have contributed to lost working years due to disability retirement.

This study was set out to examine the length of time that different educational groups in Finland spent on disability retirement during the last 10 years. To assess the contribution of different illnesses to lost working years, time spent on disability pension was calculated separately for various diagnostic groups. In addition, we assessed the impact of the rise in overall education levels.

Our research questions were as follows:

- (1) How have educational differences in time spent on disability pension changed from 2005 to 2014?
- (2) How much time do different diagnostic groups spend on disability pension and how has this changed over time?
- (3) How has the rise in overall education levels contributed to the changes in time spent on disability pension?

### Methods

Expectancies for time on disability pension were calculated using the Sullivan method, which can be used to divide total life expectancy into different mutually exclusive states.<sup>15</sup> The expectancy for time on disability pension describes the length of time that a person of a certain age is expected to draw a disability pension, assuming that the age-specific mortality rates and proportions of those receiving a disability pension remain unchanged from the initial measurement year.<sup>16,17</sup> To calculate the expectancy for time on disability pension, data on mortality and the proportion of disability pension recipients

derived from Finnish Centre for Pensions registers were linked with Statistics Finland information on education level.

The study population was restricted to persons aged 25–63, because persons under 25 do not necessarily have reached their highest educational level, and on the other hand because disability pensions are not awarded under the Finnish earnings-related pension scheme after age 63. All disability pensions are based on medico-legal evaluation by pension insurers and they are automatically transferred to old-age pensions at the general old-age pension age of 63. Very few people retire on old-age pension before that age.<sup>18</sup> Disability pensioners with no working history and therefore receiving only national pension were not included in our study. These pension recipients typically have an early onset illness and therefore a low level of education. In lower educational groups, the inclusion of these pension recipients in our data would increase the length of time spent on disability pension, particularly for retirement due to mental disorders.<sup>19</sup>

The expectancy for time on disability pension at age 25 was calculated separately for men and women in different educational groups. Period life-tables were formed annually in 2005–2014 for the age group 25–63 years, and the prevalence of disability pension was determined in the middle of each 1-year age interval in the corresponding years.<sup>20</sup> Partial disability pensions were taken into account using half weights. We separately calculated the expectancy for time on disability pension due to mental and behavioral disorders (ICD-10 codes F00–F99), musculoskeletal diseases (M00–M99), cardiovascular diseases (I00–I99) and other diseases (including injury). Education was measured at the beginning of each study year and classified as primary, secondary, lower tertiary and higher tertiary education.<sup>21</sup>

To assess whether the rise in overall education levels from 2005 to 2014 has affected the expectancy for time on disability pension, we also calculated the expectancy in 2014 on the assumption of no change in the educational distribution since 2005. The difference between the observed and expected figures can be interpreted as the effect of educational expansion on the expectancy for time on disability pension.

Table 1 provides descriptive information on the study population in 2005 and 2014. The incidence of disability retirement decreased over time in all disease categories, more so among men than women. Average age at disability retirement due to mental disorders was lower than in other diagnostic groups, and it decreased from 2005 to 2014. Average age at disability retirement due to musculoskeletal and cardiovascular diseases was particularly high, and it increased especially among men. Life expectancy in the age range of 25–63 slightly increased among both men and women. Educational level improved from 2005 to 2014 particularly among women.

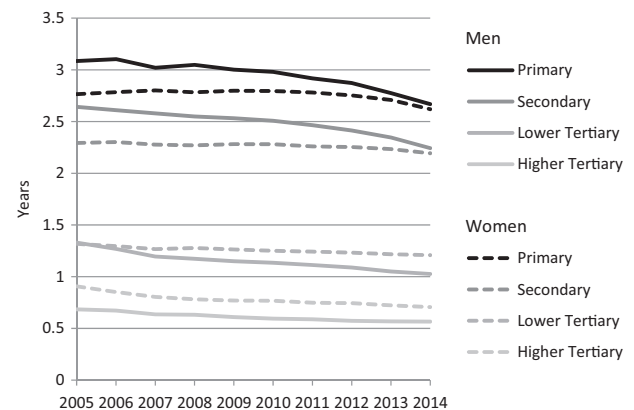
## Results

The expectancy for time on disability pension was higher among both men and women with a lower education level (figure 1). The differences were particularly large between those with a secondary education and those with a lower tertiary education. Primary and secondary educated men had a higher expectancy for time on disability pension than women, but lower and higher tertiary educated women's expectancy was higher than men's. Overall, then, educational differences were somewhat more pronounced among men than women.

The expectancy for time on disability pension decreased in all educational groups from 2005 to 2014 (figure 1, see also table 2). The decrease was sharper among men than women. In the higher tertiary education group, however, the expected amount of time on disability pension decreased more among women. In 2014, primary educated men were expected to spend 2.7 years on disability pension, compared to only 0.6 years for higher tertiary educated men. The corresponding figures for women were 2.6 years and 0.7 years.

**Table 1** Incidence of disability retirement, mean age at disability retirement, life expectancy at age 25, and distribution of educational level among men and women aged 25–63 in 2005 and 2014

	Men		Women	
	2005	2014	2005	2014
Incidence of disability pension (per 100 person years)				
Mental disorders	0.28	0.18	0.32	0.26
Musculoskeletal diseases	0.29	0.23	0.34	0.29
Cardiovascular diseases	0.11	0.07	0.05	0.03
Other diseases	0.32	0.21	0.23	0.21
All	1.00	0.69	0.94	0.79
Age at disability retirement (mean)				
Mental disorders	47.1	43.3	48.2	45.0
Musculoskeletal diseases	52.8	54.9	54.1	55.1
Cardiovascular diseases	54.5	54.8	54.5	54.6
Other diseases	51.0	52.2	51.9	52.3
All	50.8	51.0	51.6	51.0
Partial life expectancy at age 25 (years)				
Primary	34.9	35.5	36.6	36.6
Secondary	36.1	36.6	37.2	37.3
Lower tertiary	37.0	36.2	37.5	37.6
Higher tertiary	37.3	37.5	37.5	37.7
All	36.2	36.5	37.2	37.4
Distribution of educational levels (%)				
Primary	26	20	22	14
Secondary	44	48	40	40
Lower tertiary	20	20	28	31
Higher tertiary	9	11	10	15
All	100	100	100	100



**Figure 1** Expectancy for time on disability pension in 2005–2014 by educational level and gender (years)

Table 2 shows the expectancy for time on disability pension by education level in the four diagnostic groups in 2005 and 2014. There were clear educational differences in all diagnostic categories. The differences were particularly pronounced for disability retirement due to musculoskeletal diseases: in this category, the expectancy for time on disability pension was very low among the tertiary educated.

Among men, educational differences narrowed somewhat between 2005 and 2014 because the expectancy for time on disability pension due to musculoskeletal diseases, cardiovascular diseases and other diseases was higher among those with a lower education. The expectancy for disability retirement due to mental disorders decreased quite evenly across all educational levels. Educational differences in the length of time spent on disability pension due to somatic conditions also narrowed among women. The differences in disability retirement due to mental disorders, on the other hand, widened. The expectancy for time on disability pension decreased

**Table 2** Expectancy for time on disability pension by educational level and diagnostic group among men and women in 2005 and 2014 (years)

	All diagnoses	Mental disorders	Musculoskeletal diseases	Cardiovascular diseases	Other diseases
<b>Men</b>					
2005					
Primary	3.09	1.13	0.76	0.34	0.86
Secondary	2.64	0.93	0.67	0.29	0.74
Lower tertiary	1.33	0.58	0.21	0.17	0.38
Higher tertiary	0.68	0.38	0.03	0.09	0.18
2014					
Primary	2.67	1.07	0.63	0.22	0.74
Secondary	2.24	0.86	0.58	0.19	0.62
Lower tertiary	1.03	0.46	0.17	0.09	0.30
Higher tertiary	0.57	0.33	0.04	0.06	0.14
Change 2005–2014					
Primary	−0.42	−0.05	−0.13	−0.11	−0.12
Secondary	−0.40	−0.07	−0.10	−0.11	−0.12
Lower tertiary	−0.30	−0.12	−0.04	−0.07	−0.08
Higher tertiary	−0.12	−0.06	−0.00	−0.03	−0.03
<b>Women</b>					
2005					
Primary	2.76	1.19	0.82	0.14	0.63
Secondary	2.29	0.97	0.69	0.12	0.51
Lower tertiary	1.32	0.65	0.28	0.06	0.33
Higher tertiary	0.91	0.52	0.10	0.03	0.26
2014					
Primary	2.62	1.26	0.69	0.10	0.57
Secondary	2.19	1.01	0.62	0.09	0.47
Lower tertiary	1.21	0.60	0.24	0.05	0.31
Higher tertiary	0.71	0.41	0.09	0.03	0.18
Change 2005–2014					
Primary	−0.15	0.07	−0.13	−0.03	−0.06
Secondary	−0.10	0.04	−0.06	−0.02	−0.05
Lower Tertiary	−0.11	−0.05	−0.04	−0.00	−0.02
Higher Tertiary	−0.20	−0.11	−0.02	−0.00	−0.08

among tertiary educated women but slightly increased among those with a primary or secondary education. Overall, time spent on disability pension showed no consistent pattern of change between women's educational groups.

As shown in table 1, overall educational levels increased from 2005 to 2014. This may have contributed to the reduced amount of time spent on disability pension, as the expectancy for time on disability pension was shorter among the more highly educated. Table 3 shows the contribution of the rise in overall educational levels to the reduction in the amount of time spent on disability pension. Among men (for all educational levels combined), the expectancy for time on disability pension decreased from 2.39 years in 2005 to 1.93 years in 2014. If the educational distribution had been unchanged from 2005, the disability pension expectancy among men would have been 2.03 years. The change in the educational distribution thus explained 21% of the reduction in the time that men spent on disability pension. Among women, 65% of the reduction in time on disability pension was explained by the rise in educational levels.

In both men and women, the rise in educational levels had the greatest effect on the amount of time on disability pension due to mental disorders, and the smallest effect on time on disability pension due to cardiovascular diseases. Among women, rising education explained more than 100% of the reduction in time spent on disability pension due to mental disorders. Without the rise in educational levels, therefore, the amount of time spent on disability pension due to mental disorders would in fact have increased.

## Discussion

We found clear educational differences in expectancies for time spent on disability pension. People with a lower educational level

spent more time on disability pension than people with a higher education in all diagnostic categories, but the finding was strongest for musculoskeletal diseases. Time spent on disability pension decreased in all educational groups over time. Educational differences narrowed somewhat for disability retirement due to somatic diseases but increased for disability retirement due to mental disorders. The reduced amount of time spent on disability pension was explained in part by the rise in overall education levels.

### Methodological issues

Expectancies for time spent on disability pension were calculated using the Sullivan method. For each year the calculations were based on the assumption of no change in age-specific mortality and the prevalence of disability pension (following the traditional period life table assumption). Expectancy is thus a theoretical figure describing the prevailing time period rather than future development.

When expectancies are calculated for different population subgroups, it is also assumed that each person will remain in the same group throughout their life-course.<sup>22,23</sup> Educational level was measured as the highest degree attained; therefore no one's level of education can decrease, but in younger age groups not everyone has as yet reached their final level of education. However, compared to many other structural measures of socioeconomic circumstances, level of education can be considered a fairly stable indicator.

The contribution of rising education was calculated on the assumption that even if the distribution of educational attainment was held constant at the 2005 level, within all educational groups the prevalence of disability pension would have changed until 2014 as it did. However, when the overall level of education rises, people with a

**Table 3** Contribution of educational expansion to change in expectancy for time on disability pension between 2005 and 2014 (years)

	DP time in 2005	DP time in 2014	Expected DP time in 2014 <sup>a</sup>	Observed change from 2005 to 2014 (O)	Expected change from 2005 to 2014 (E)	Percentage explained by change of educational structure <sup>b</sup>
<b>Men</b>						
All	2.39	1.93	2.03	-0.46	-0.36	21
Mental	0.87	0.77	0.81	-0.10	-0.06	41
Musculoskeletal	0.58	0.46	0.48	-0.12	-0.10	18
Cardiovascular	0.27	0.17	0.18	-0.11	-0.10	9
Other	0.67	0.54	0.57	-0.13	-0.10	22
<b>Women</b>						
All	2.10	1.81	2.00	-0.29	-0.10	65
Mental	0.90	0.84	0.93	-0.06	0.03	152
Musculoskeletal	0.62	0.48	0.54	-0.13	-0.07	44
Cardiovascular	0.11	0.08	0.08	-0.03	-0.02	27
Other	0.48	0.41	0.45	-0.08	-0.04	53

a: Expectancy for time on disability pension assuming no change in distribution of educational levels from 2005.

b: (O-E)/O\*100.

low education become more a selected group, which may affect the developments within the educational groups.

### Evaluation of the findings

We found clear educational differences in expectancies for time spent on disability pension. In particular, primary and secondary educated people are expected to spend more time on disability pension than those with a lower or higher tertiary education. The gap between the secondary and the lower tertiary educated mainly stems from the large difference in the incidence of disability pension between these educational groups.<sup>8</sup> Life expectancy, on the other hand, increases fairly gradually with a rising education level.<sup>24</sup> Educational differences in time spent on disability pension were slightly greater among men than women. These findings are consistent with previous results showing higher educational level differences in the incidence of disability pension among men.<sup>25,26</sup>

Our results broadly agree with an earlier Finnish study that examined how life expectancy at age 50 is distributed among different labor market states by social class.<sup>10</sup> Both these studies found that the length of time spent on disability pension has decreased in all socioeconomic groups, but more so in lower status groups, which has caused the differences to shrink. The reduced amount of time spent on disability pension reflects the declining incidence of disability retirement.<sup>12</sup> However, the incidence of disability retirement has fallen much more sharply over the past 10 years than the length of time spent on disability pension. This is because the incidence of disability retirement has decreased particularly in older age groups. In younger age groups, the incidence of disability retirement has in fact slightly increased.<sup>12</sup>

Educational differences in time spent on disability pension were found in all diagnostic groups. The differences were particularly pronounced for disability retirement due to musculoskeletal diseases, as the expected length of time on disability pension for the tertiary educated was very low in this disease category. The educational differences were also quite clear in disability retirement due to mental disorders. This result may have been affected by people with mental disorders being selected into lower educational groups. Mental health problems often develop during adolescence, which may hamper educational attainment.<sup>27</sup>

Although the incidence of disability retirement due to musculoskeletal diseases is higher than that due to mental disorders, the latter accrued more disability pension time than musculoskeletal diseases. These findings correspond to a previous Norwegian study.<sup>13</sup> As most disability pensions continue until old-age pension, age at disability pension award is a crucial determinant of length of time spent on disability pension. Disability pensions due to mental disorders

typically begin at a younger age than those granted due to somatic diseases. In addition to age at pension initiation, other factors such as increased mortality may shorten the length of time spent on disability pension especially after some serious diagnoses such as neoplasms. Even though the length of time spent on disability pension due to mental disorders was shorter in higher than in lower educational groups, a substantial proportion of the total amount of time on disability pension is attributable to mental disorders, particularly at higher educational levels.

A previous study has shown that musculoskeletal diseases account for a large part of socioeconomic differences in the incidence of disability retirement.<sup>28</sup> However, it seems that this is not the case for the length of time spent on disability pension. Among men and women, educational differences in time spent on disability pension were attributable to different disease categories. Cardiovascular diseases and other somatic diseases accounted for men's longer disability pension time at lower educational levels. These disease categories have also seen the most rapid changes, which have caused the differences between men and women to narrow.

Among men, educational differences decreased as a result of a sharper decrease in the length of time on disability pension due to somatic conditions among the lower educated. No clear pattern was seen for time on disability pension due to mental disorders. Among women, too, educational differences in time on disability pension due to somatic conditions narrowed, but for disability retirement due to mental disorders they widened. Among lower educated women, disability retirement due to mental disorders actually increased somewhat. Despite the diverging trends, the contribution of mental disorders to the educational differences in total length of time spent on disability pension time has increased in both men and women. Furthermore, if mental disorders are under-recognized in the disability evaluation process,<sup>29,30</sup> this may have reduced the amount of time spent on disability pension due to mental disorders.

We also assessed whether rising overall education levels have contributed to the reduction in the amount of time spent on disability pension. Among women, 65% of the decrease in expected time on disability pension could be attributed to the growing proportion of people with a tertiary education and the declining proportion of those with a primary education. Among men, the changes in overall education were less pronounced and their effects accordingly smaller than among women. However, the length of time that men spent on disability pension decreased more than in the case of women, because the decrease seen within the educational groups was steeper than among women.

Changes in overall education explained more of the reduction in time spent on disability pension due to mental disorders than in other disease categories. Among women, the percentage explained

exceeded 100%, implying that without educational expansion, time on disability pension due to mental disorders would in fact have increased. The smallest contribution to the reduction in time on disability pension was recorded for cardiovascular diseases. The differences between the diagnostic groups depend on the educational groups within which the changes in time on disability pension occur. Time spent on disability pension due to mental disorders increased among people with a primary and a secondary education, and both these groups have decreased in size. In cardiovascular diseases, the reduction in the length of time spent on disability pension was slightly greater among those with a lower education.

## Conclusion

There are marked educational differences in the amount of time spent on disability pension. That time has decreased at all educational levels as a result of the shorter time on disability pension due to somatic conditions. In lower educated groups, the length of time that women spend on disability pension due to mental disorders has in fact increased. The contribution of mental disorders to educational differences in time spent on disability pension has increased over time.

*Conflicts of interest:* None declared.

### Key points

- Time spent on disability pension has decreased at all educational levels as a result of reduced disability pension time due to somatic conditions.
- Mental disorders account for an increasing share of educational differences in early exit from working life through disability retirement.
- Policies must be put in place to help people with mental health problems stay on at work: this will both extend working careers and reduce social security outlays.

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