Municipality-level differences in disability retirement in Finland: the contribution of local social characteristics

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Abstract

Aims: Large differences exist in the risk of disability retirement between Finnish municipalities. This study examined whether individual-level and municipality-level characteristics explain these differences and which municipality-level characteristics are particularly important for the risk of disability retirement.

Methods: Individual-level register data was supplemented with ten municipality-level characteristics from various databases. A 20% sample of the Finnish population (N=626,391) was followed for transition to disability retirement from 2016 to 2019 using multilevel Weibull models.

Results: Of the total variation in the risk of disability retirement, 4.3% was attributed to the municipal-level and decreased to 1.8% when individual-level characteristics (gender, age, education level and entitlement to special reimbursement for medical expenses, reflecting morbidity) were controlled for. Further adjustment for municipality-level characteristics fully erased the differences between municipalities. The proportion of municipality-level variation was larger for disability retirement due to somatic illnesses than mental disorders. Of the municipality-level characteristics, socioeconomic structure, unemployment rate, poverty, net migration between municipalities, dependency ratio, the amount of tax revenue per capita, and morbidity were associated with the risk of disability retirement.

Conclusions: The municipality-level variation in the risk of disability retirement is largely explained by the individual characteristics of the inhabitants. However, various characteristics of the municipalities show associations with the risk of disability retirement. Recognizing such factors is essential for shaping policies that mitigate disability retirement risk.

Key words: Disability pension; region; municipality; work ability; Finland

Introduction

Large regional differences in disability benefit receipt exist in the Nordic countries [1-4] and elsewhere [5-7]. In the 19 administrative regions of Finland, the proportion of working-aged people receiving a disability pension varies from 3.4% to 8.3%, with even greater differences between the 309 individual municipalities. These geographical variations also show remarkable persistence over time [8].

While part of the regional differences can be attributed to population composition, such as a higher percentage of older employees in areas with elevated disability rates, contextual characteristics of the areas may also play a role. Previous studies have found that local factors such as unemployment rate [9, 10] and access to health services [11] are associated with the risk of disability retirement. Identifying significant area-specific characteristics can contribute to understanding the variations in disability retirement and devising prevention strategies.

The aims of this study were to examine the magnitude of municipality-level variation in disability retirement, to determine to which extent this variation is explained by individual-level and municipality-level characteristics, and to examine which municipality-level characteristics are particularly important for the risk of disability retirement.

Methods

The study population included the entire non-retired population living in mainland Finland, aged 15–62 years in the end of 2015. This study population was followed up for disability retirement until the end of 2019 using data compiled from the registers of the Social Insurance Institution of Finland (Kela), the Finnish Centre for Pensions, and Statistics Finland. Information on ten municipality-level characteristics from the end of 2015, retrieved from various statistical databases, was linked with the individual-level register data using municipality codes. The municipality-level characteristics and their sources are presented in Table 1.

Transition to earnings-related or national disability pension over four years was used as the outcome variable. A national pension is paid when there is no earnings-related pension or when the earnings-related pension is very low. A disability pension can be granted to a person aged 16–65 years who has an illness that limits work ability for at least one year. Shorter periods of work disability are covered by sickness allowance.

The data were analysed using multilevel Weibull models, with individuals nested within municipalities (n=295). Due to computational demands associated with multilevel models, a 20% random sample of the data, comprising 626,390 individuals, was utilized. The sample was divided into quartiles by each of the municipality-level characteristics, with approximately 157,000 individuals in each quartile. Over the follow-up period, 15,437 persons (2.46%) retired due to disability. Of these, two-thirds were attributed to somatic illnesses (n=9,913) and one-third to mental health reasons (n=5,524). Individuals who transitioned to old age pension or died before the age of 63 were censored.

To assess the magnitude of municipality-level variation in disability retirement, variance components (random effects) were computed [12-14]. The initial model included only the random group indicator for the municipality. The intraclass correlation coefficient (ICC) calculated from this model expresses the proportion of municipality-level variation of the total variation in the risk of disability retirement. Individual-level characteristics (age, gender, educational level, and morbidity, measured by medicine reimbursements) and municipality-level characteristics were then introduced to examine the extent to which they explained the municipality-level variation.

Fixed effects of municipality-level characteristics on disability retirement are reported as hazard ratios (HR) with 95% confidence intervals (CI). These are derived from the multilevel models to account for potential correlation among individuals within municipalities.

Because the study solely relied on register data, no ethical review was required for the study [15].

Results

Table 1 provides descriptive information about the distribution of municipality-level characteristics across quartiles. There were substantial differences between quartiles in all of the characteristics, spanning from a 1.5-fold difference in average tax revenue to a 2.3-fold difference in the proportion of the population working in manufacturing or construction.

Table 1. Descriptive statistics of the distribution of the municipality level characteristics in quartiles at the end of 2015.

		Quartile means			
	All municipalities	**Lowest quartile**	**2nd lowest quartile**	**2nd highest quartile**	**Highest quartile**
Age structure: proportion (%) of persons aged 50 and over among population aged 18–64[1]	33.7	26.9	30.1	35.1	42.9
Socio-economic structure: proportion (%) having tertiary education of population aged 15 and over[2]	30.7	21.0	28.3	33.2	40.6
Unemployment rate: proportion (%) unemployed of the labour force[2]	13.5	9.7	12.1	14.4	17.7
Poverty: proportion (%) of social assistance recipients of population aged 25–64[2]	7.5	4.7	6.8	8.2	10.2
Migration: between-municipality net migration, persons per 1000 inhabitants[2]	0	-8.1	-0.4	4.8	7.1
Dependency ratio: number of those not employed relative to 100 employed persons[3]	58	46	52	62	72
Tax revenue: municipal tax revenue per inhabitant (€)[2]	4010	3343	3790	4116	4912
Self-sufficiency in jobs: number of jobs at workplaces in the municipality relative to 100 employed persons living in the municipality[4]	100	72	98	108	126
Industrial structure: proportion (%) of population of the labour force working in manufacturing or construction[2]	19.2	11.9	17.2	21.2	27.4
Morbidity: proportion (%) of population aged 25-64 entitled to special reimbursement for medicine expenses[2]	20.7	15.9	19.6	22.0	26.3

Data sources: [1] Population frequency data from the database of the Social Insurance Institution of Finland (Kela), [2] Sotkanet database of the Finnish Institute for Health and Welfare (THL), [3] StatFin database of Statistics Finland, [4] Municipality indicators database of Statistics Finland

Table 2 shows that 4.3% of the variability in the risk of disability retirement could be attributed to the municipality level. Notably, the proportion of municipality-level variation was clearly larger for disability retirement due to somatic illnesses than in mental disorders. Comparing the ICCs derived from the different models shows that adjusting for the individual-level characteristics accounted for 57% of the municipality-level variation, with a larger effect observed in disability retirement due to somatic illnesses (62%) than due to mental disorders (23%). Further adjustment for municipality-level characteristics fully eliminated the differences in disability retirement rates between municipalities.

Table 2. Random effects. The proportion of municipality-level variance of the total variance in the risk for disability retirement (ICC, %) and the p-value for municipality-level differences after controlling for the individual-level and municipality-level characteristics

	All		**Disability retirement due to somatic illnesses**		**Disability retirement due to mental disorders**	
	ICC	p-value	ICC	p-value	ICC	p-value
Unadjusted	4.28	<0.001	6.47	<0.001	2.50	<0.001
Individual-level characteristics	1.83	<0.001	2.46	<0.001	1.92	0.003
+Age structure	1.39	<0.001	1.72	<0.001	1.75	0.006
+Socio-economic structure	1.46	<0.001	1.66	<0.001	1.84	0.004
+Unemployment rate	1.22	<0.001	1.69	<0.001	1.27	0.075
+Poverty	1.76	<0.001	2.40	<0.001	1.76	0.004
+Migration	1.57	<0.001	1.96	<0.001	1.92	0.002
+Dependency ratio	1.54	<0.001	1.81	<0.001	1.92	0.003
+Tax revenue	1.00	<0.001	1.17	<0.001	1.28	0.064
+Self-sufficiency in jobs	1.81	<0.001	2.43	<0.001	1.82	0.004
+Industrial structure	1.77	<0.001	2.37	<0.001	1.90	0.003
+Morbidity	0.87	<0.001	0.94	<0.001	1.68	0.007
Individual-level and all municipality-level characteristics	0.16	0.08	0.17	0.19	0.01	0.94

Of the municipality-level characteristics, socioeconomic structure, unemployment rate, poverty, migration, dependency ratio, tax revenue and morbidity were associated with the risk of disability retirement after controlling for individual-level characteristics (Table 3). Age structure was associated both with disability retirement due to somatic illnesses and mental disorders (in opposite directions) but no association was found when the illness categories were combined. Socioeconomic structure, migration, and dependency ratio were associated with disability retirement due to somatic illnesses only. Conversely, municipality-level poverty rate was associated with disability retirement due mental disorders but not somatic illnesses. Self-sufficiency in jobs and industrial structure showed no statistically significant association with disability retirement. Overall, however, the found associations were fairly modest in effect sizes. Unemployment, tax revenue, and morbidity showed the strongest associations.

Table 3. Fixed effects. Association of the municipality-level characteristics with the risk of disability retirement after adjusting for the individual-level characteristics. Hazard ratios (95% confidence intervals). Variables that were not statistically significant in any of the analyses are not shown in the table.

	All HR (95% CI)	**Somatic illnesses HR (95% CI)**	**Mental disorders HR (95% CI)**
Age structure			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	0.92 (0.79-1.07)	0.96 (0.80-1.14)	0.85 (0.73-0.99)
2nd highest quartile	0.97 (0.85-1.12)	1.04 (0.88-1.23)	0.89 (0.77-1.03)
Highest quartile	1.10 (0.96-1.26)	1.20 (1.03-1.41)	0.93 (0.80-1.07)
Socioeconomic structure			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	0.94 (0.88-1.01)	0.91 (0.84-0.98)	1.01 (0.92-1.11)
2nd highest quartile	0.90 (0.83-0.97)	0.83 (0.76-0.91)	1.05 (0.95-1.16)
Highest quartile	0.80 (0.71-0.90)	0.74 (0.65-0.86)	0.94 (0.81-1.08)
Unemployment rate			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	1.01 (0.93-1.11)	0.97 (0.87-1.08)	1.07 (0.96-1.20)
2nd highest quartile	1.19 (1.12-1.27)	1.20 (1.11-1.30)	1.16 (1.06-1.26)
Highest quartile	1.23 (1.14-1.32)	1.20 (1.10-1.31)	1.28 (1.16-1.40)

	All HR (95% CI)	Somatic illnesses HR (95% CI)	Mental disorders HR (95% CI)
Poverty			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	1.05 (0.98-1.13)	1.00 (0.93-1.08)	1.05 (0.95-1.15)
2nd highest quartile	1.12 (1.04-1.20)	1.07 (0.99-1.15)	1.14 (1.04-1.25)
Highest quartile	1.07 (0.95-1.20)	1.05 (0.92-1.19)	1.08 (0.94-1.23)
Migration			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	0.94 (0.88-1.00)	0.93 (0.86-1.00)	0.97 (0.89-1.06)
2nd highest quartile	0.86 (0.79-0.94)	0.81 (0.73-0.90)	0.97 (0.87-1.08)
Highest quartile	0.93 (0.83-1.04)	0.89 (0.78-1.02)	1.01 (0.88-1.16)
Dependency ratio			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	1.03 (0.87-1.21)	1.06 (0.88-1.28)	0.99 (0.84-1.17)
2nd highest quartile	1.15 (0.99-1.35)	1.24 (1.04-1.48)	1.02 (0.87-1.20)
Highest quartile	1.18 (1.01-1.37)	1.30 (1.09-1.53)	0.98 (0.84-1.15)
Tax revenue			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	1.00 (0.94-1.06)	0.96 (0.89-1.03)	1.11 (1.02-1.21)
2nd highest quartile	0.90 (0.84-0.96)	0.85 (0.79-0.92)	0.99 (0.91-1.08)
Highest quartile	0.71 (0.64-0.79)	0.65 (0.57-0.74)	0.85 (0.75-0.96)
Morbidity			
Lowest quartile	1.00	1.00	1.00
2nd lowest quartile	1.19 (1.06-1.32)	1.25 (1.10-1.42)	1.10 (0.96-1.26)
2nd highest quartile	1.28 (1.15-1.43)	1.39 (1.23-1.58)	1.11 (0.97-1.28)
Highest quartile	1.46 (1.32-1.63)	1.60 (1.42-1.81)	1.22 (1.07-1.40)

Discussion

There are large regional differences in disability retirement in Finland, which are broadly similar to those in morbidity [16]. We examined the potential effects of a wide range of municipal-level characteristics on these differences. After controlling for individual characteristics, a relatively small proportion of the variation could be attributed to the municipality level. This is consistent with findings on regional health disparities [17-19]. Previous studies of disability retirement with a more limited set of area-level characteristics have also found relatively modest area-level contributions [2, 20].

Most of the municipal-level characteristics examined were associated with the risk of disability retirement, but the associations were generally rather weak. Unemployment, tax revenue, and morbidity rate of the municipality showed the strongest associations. Compared to the lowest quartile, people living in the municipalities with the highest morbidity had about 50% higher risk of disability retirement, while in the municipalities with the highest tax revenue the risk was one-third lower. This may reflect better employment prospects among those with work ability problems in the wealthier municipalities.

There was much less regional variation in disability pensions due to mental health problems than due to somatic diseases. This may reflect area differences in occupational structures, as work ability problems due to somatic illnesses may concentrate in certain occupations and industries, while mental health problems can affect a wider range of occupations. In general, however, the association between regional characteristics was quite similar for somatic and mental causes, but often slightly weaker for mental health problems. The associations for pensions due to mental health problems were less often statistically significant, which is also influenced by the smaller number of cases.

Conclusions

Our study found that the effect of municipality characteristics on disability retirement is limited. While individual characteristics are the primary determinants of disability retirement, it is nevertheless important to recognise the potential impacts of regional labour market and living conditions. Higher unemployment rate, lower tax revenue and higher morbidity were most strongly associated with the risk of disability retirement. Effective policy interventions should recognize such contextual factors in developing comprehensive risk reduction strategies.

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Declaration of Conflicting Interests

The Authors declare that there is no conflict of interest.

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