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Long-term sickness absences based on mental disorders by socioeconomic group – trends of prevalence in Finland 2010–2023

Riku Perhoniemi[1*] and Jenni Blomgren[1]

Abstract

Background Long-term sickness absences (LTSA) are often linked to mental disorders. Up-to-date register-based evidence on the prevalence and trends of LTSA based on mental disorders is lacking, as is understanding of socioeconomic differences. This study examines the trends in prevalence of LTSA based on mental disorders in various socioeconomic groups both employed and outside employment.

Methods Finnish 18–67 years old non-retired residents were included in yearly study populations for 2010–2023. LTSA prevalence was examined through receipt of compensated sickness allowance. Yearly age-adjusted prevalences of LTSA were calculated for six socioeconomic groups using direct standardization. Adjusting for various covariates, relative risks (RR) between socioeconomic groups in LTSA prevalences were then analysed for 2010 and 2023 using Modified Poisson regression models. All analyses were run separately for both sexes, and for all mental disorders combined, for mood disorders, anxiety disorders, and other mental disorders combined.

Results The prevalence of LTSA based on mental disorders increased from 2010 to 2023 among all socioeconomic groups and for both sexes, but especially among lower non-manual female employees due to anxiety disorders, and among students and unemployed persons due to mood disorders. Compared to upper non-manual employees, the higher covariate-adjusted relative risks for LTSA based on mental disorders in lower non-manual employees increased slightly during the study period *(women: RRs 1,13 to 1,25; men: RRs 1,20 to 1,30)*. While age-group-standardized trends showed an approximately similar risk for manual workers compared to upper non-manual employees, covariate-adjusted modelling revealed a slightly lower relative risk, most apparent for anxiety disorders (*RR in 2023 0,79*). Entrepreneurs had a consistently lower relative risk compared to other groups.

Conclusions The prevalence of long-term sickness absences due to mood and anxiety disorders have increased among all socioeconomic groups, but register data also reveals group differences in prevalences and trends. Factors related to covid-19 pandemic, intensity of job demands, and buffering resources may explain these differing trends. Employees, but also students and unemployed persons need support to curb the increase in LTSA due to mental disorders.

Keywords Long-term sickness absence, Work disability, Socioeconomic position, Population-based study, Register study

Introduction

In OECD countries, recent years have witnessed an increase in mental disorders [1, 2]. Moreover, the covid-19 pandemic, recent global conflicts and their wide financial consequences appear to have exacerbated the mental

*Correspondence:
Riku Perhoniemi
riku.perhoniemi@kela.fi
[1] The Social Insurance Institution of Finland, Nordenskiöldinkatu 12, 00250 Helsinki, Finland

health crisis [3, 4]. Simultaneously, mental disorders are increasingly associated with long-term sickness absences (LTSA), especially due to common mental disorders such as depression, mood disorders and anxiety disorders. However, while high proportions of sickness absence and benefit spells based on mental disorders have been reported [5, 6], as well as an increase in last decades [7–9], recent register-based international evidence on the prevalence and possible increase is surprisingly very scarce [10].

Moreover, reasons behind the increase in mental disorders and related sickness absences are not well understood, but it is paramount as LTSA based on mental disorders particularly increases the risk for permanent disability [11–16]. One key question is if and how socioeconomic groups differ in LTSA prevalence based on mental disorders, and to what extent there is an increasing trend in different groups. Unraveling trends by socioeconomic group can add to understanding factors behind the increasing general trend. Various studies in Nordic countries have shown an association between lower occupational position and a higher all-cause LTSA risk [17–25]. In these studies, manual workers have had more frequent LTSA spells than non-manual workers. High frequency of also LTSA based on mental diagnoses has been reported among manual and lower non-manual workers [26, 27], although occupational group differences can be smaller than for other diagnosis groups [22]. Finnish studies have further showed an even higher prevalence for routine or lower non-manual workers compared to manual workers [22–24, 27].

As an occupational class, not much is known internationally about sickness absences of entrepreneurs. This is partly because their entitlement to LTSA benefits and LTSA periods' registration depend on national systems. While several studies have shown a low risk of LTSA [28], Pedersen et al. [29] have interestingly shown that compared to wage earners, self-employed persons actually have a higher risk of LTSA in Denmark. In a Finnish study, the prevalence of LTSA based on mental disorders was lower for entrepreneurs than for other occupational groups or the unemployed [23].

Another socioeconomic difference in LTSA prevalence based on mental disorders may run between those employed and those outside employment. The unemployed, especially long-term unemployed, have poorer average health [30, 31] and may be at particular risk of developing a mental disorder [32]. Harkko's et al. [33] population-based study found a strong association between unemployment and a risk for future LTSA due to common mental disorders. More generally unemployment has been found to increase the risk of future disability pension [34–36]. Thus, understanding this group's LTSA trends is important.

Another socioeconomic group mainly outside employment and worthy of interest in respect of mental health and work disability are students. Higher education students have a high risk for depression and other mental disorders [6, 37], and the disruptions caused by covid-19 further increased the prevalence of depressive and anxiety symptoms among this group [38] and the young in general [39] in many countries. All in all, mental disorders among students or young persons in general naturally pose a substantial risk to a sustainable working life and could contribute to a long-term mental health crisis. The Finnish disability benefit scheme allows for following the prevalence of diagnosis-based LTSA among students, and thus may strengthen the understanding how student status is associated with occupational disability caused by mental disorders.

Besides socioeconomic differences in LTSA trends based on mental disorders in general, a better understanding is needed of how socioeconomic groups differ in prevalence of LTSA due to various types of mental disorders. While there are studies comparing the risk different mental disorder diagnoses pose for permanent disability [40, 41], we are not aware of previous studies on LTSA prevalence trends stratified by mental disorder types and socioeconomic group. In Finland LTSA due to anxiety disorders has recently increased the most, while the prevalence is the highest for LTSA due to depression [10].

Furthermore, central factors affecting disability benefits based on mental disorders are sex and age [18, 19, 23, 42]. Women have generally more prevalent LTSA based on mental disorders than men. The association of age can be non-linear as middle-aged persons can have the highest prevalence [7, 23]. In Finland, the recent rise in LTSA based on mental disorders is found in both sexes, and all age groups, but has been substantial among young female adults and middle-aged women [10]. In addition, educational level can confound the association that socioeconomic status has with LTSA risks, and may in itself be a significant predictor for LTSA especially based on mental disorders [43]. These socio-demographic covariates need to be adjusted for when comparing socioeconomic groups.

Using up-to-date register-based data, this study examines the prevalence and changes in prevalence of LTSA based on mental disorders both in occupational classes and also in socioeconomic groups outside full-time employment—the unemployed and students.

Data and methods

Study population

Register data on demographics including Finnish residence, sex, age and marital status, and full-time sickness allowance spells were gathered from the Social Insurance Institution of Finland (Kela) and Statistics Finland and linked to the data on socioeconomic grouping and educational level from Statistics Finland.

The study population was defined using year-end information from years 2009–2022. Finnish 18–67 years old non-retired residents were included in yearly study populations for 2010 to 2023. The age limit was made based on who are eligible to receive compensation for sickness absence, lower limit to include adults only. Those with missing information of their socioeconomic grouping, or having other status than upper or lower non-manual employee, manual worker, entrepreneurs, unemployed or students were excluded (4.0—5.2% each year). The whole study sample altogether consisted of 3,927,942 persons.

Compensated sickness absence in Finland

Sickness absence was measured through compensated sickness allowance days. Kela can pay sickness allowance to a non-retired person aged 16–67 as compensation for loss of income due to sickness or impairment. In Finland, also students and the unemployed may be entitled to compensated sickness absence if they are disabled for studying or seeking work. For all socioeconomic groups, the allowance is paid when the sickness absence exceeds 10 working days counting from the day work disability was verified. For employees, the 10-day waiting period before the allowance is financially covered by the employer with salary, and for entrepreneurs by another benefit insured under the Self-Employed Persons' Pensions Act. For persons on other social benefits such as student allowance or unemployment benefit, the running benefit can be paid during the waiting period for sickness allowance. A physician's sickness certificate is needed for the allowance. Full-time sickness allowance can usually be paid for a maximum of twelve months during two years' time.

Register data on sickness allowance spells included the first day of occupational disability, the start and end dates of each spell, and the diagnosis for each spell. For each person in the study population, a measure of having LTSA compensated by sickness allowance (yes/no) was constructed yearly in 2010–2023, based on the beginning date of work disability and the last day of sickness allowance. If an LTSA period extended over two calendar years, it was also counted to both.

The LTSA prevalences were examined for all mental disorders combined and separately for Mood disorders (F30–F39), Neurotic, stress-related and somatoform disorders (from here on Anxiety disorders, F40–F48) and Other mental disorders (other F-labelled diagnoses). The classification is based on ICD-10 classification [44].

Socioeconomic groups and covariates

Following the classification of Statistics Finland [45], socioeconomic grouping distinguished between four occupational classes—upper and lower non-manual employees, manual workers and entrepreneurs including the self-employed and owners of companies, -but also unemployed persons and students.

Classification and distributions of socio-demographic covariates are presented in Table 1 for years 2010 and 2023. Age was classified into four groups (see Table 1). Marital status was categorized as married, unmarried, and divorced, separated or widowed. Educational level was categorized as upper tertiary, lower tertiary, secondary, or having primary educational level only.

Statistical methods

Age-standardized LTSA prevalences (% of persons having LTSA based on mental disorders) for years 2010–2023 were calculated using the direct standardization method using the four age groups. The standard population was defined as pooled population of all years. Age-standardized prevalences were calculated separately for the socioeconomic groups, as well as for the three mental disorder diagnostic groups, and stratified by sex.

Generalized linear models were also applied to analyse adjusted relative differences between socioeconomic groups in yearly LTSA prevalences. Modified Poisson regression models with log link function and robust standard errors [46, 47] were run to examine the relative risks for years 2010 and 2023, first and last year of our study period. We adjusted for age group, marital status, and education in the models. The models were run separately among women and men. The results are presented as relative risks (RR) with their 95% confidence intervals (CI). The analyses were performed with Stata 18.0 [48].

Ethical considerations, ethics approval and consent to participate

The study used secondary data retrieved from registers, and no human subjects were contacted to collect the data. According to the General Data Protection Regulation of the EU [49] and the Finnish Data Protection Act [50], processing of personal data is permitted without informed consent for a task carried out in the public interest, such as scientific research. In Finland, an ethical review statement is not required for studies based solely on administrative register data [51]. We followed good scientific practice, data protection guidelines and ethical standards [51] in compliance with the Helsinki

Table 1 Distribution of socioeconomic groups and covariates among women and men in 2010 and 2023. Finnish non-retired residents 18–67 years old

	Women				Men			
	2010		2023		2010		2023	
	N	%	N	%	N	%	N	%
Socioeconomic group								
Upper non-manual employees	249,493	17.5	314,494	22.6	260,204	18.2	305,689	21.5
Lower non-manual employees	591,112	41.5	587,550	42.2	245,895	17.2	265,553	18.7
Manual workers	254,255	17.9	197,035	14.1	471,639	33.0	457,644	32.2
Entrepreneurs	87,662	6.1	88,254	6.3	157,125	11.0	162,751	11.4
Unemployed	125,440	8.8	108,744	7.8	182,488	12.8	148,811	10.5
Students	119,545	8.4	97,125	7.0	112,970	7.9	82,883	5.8
Age group								
18–30 y	364,202	25.5	357,325	25.7	367,524	25.7	375,755	26.4
31–40 y	297,383	20.8	328,792	23.6	310,894	21.7	348,517	24.5
41–50 y	339,097	23.8	304,680	21.9	341,351	23.9	314,008	22.1
51–67 y	426,825	29.9	402,405	28.9	410,552	28.7	385,051	27.1
Marital status								
Married	685,331	48.0	608,850	43.7	646,962	45.2	566,674	39.8
Unmarried	542,287	38.0	590,567	42.4	640,982	44.8	712,326	50.1
Divorced / separated / widowed	199,889	14.0	193,785	13.9	142,377	10.0	144,331	10.1
Educational level								
Upper tertiary	168,773	11.8	170,294	12.5	141,290	9.9	130,534	9.5
Lower tertiary	399,489	28.0	364,068	26.8	268,865	18.8	234,770	17.0
Secondary	620,832	43.5	623,807	45.9	698,829	48.9	723,279	52.5
Primary	238,413	16.7	201,487	14.8	321,337	22.5	289,414	21.0
Total	1,427,507	**100.0**	1,359,656	**100.0**	1,430,321	**100.0**	1,377,997	**100.0**

Declaration [52] in collecting and analysing the data and in reporting the results. The data were fully pseudonymised by the data providers, and the researchers had no access to the personal identifiers of the study subjects. There are legal restrictions that prevent from sharing data publicly. Pseudonymised data cannot be openly shared since use of sensitive individual-level health data is strictly regulated by law [50, 53] and the data providers have not given permissions for further data sharing.

Results

Age-standardized trends of LTSA

Figure 1 shows the age group-standardized prevalences of LTSA due to all mental disorders, mood disorders, anxiety disorders, and other mental disorders separately among women and men in 2010–2023. Examining LTSA due to any mental disorder, there was an increase in prevalence in both sexes, and in all socioeconomic groups between 2010 and 2023, except for male entrepreneurs. The increase was clear after 2016, but halted in 2020 in most socioeconomic groups, even decreasing for the unemployed and students. For both sexes, while the relative order in prevalence remained largely the same, the relative differences between socioeconomic groups were bigger in 2023 than in 2010. The entrepreneurs had the lowest prevalence for all study years among women, and among men for the latter half of the study period.

Among women, the absolute increase was significantly larger than among men, in all socioeconomic groups. Moreover, among women, while halting in some of the socioeconomic groups in 2020, the increase continued from 2021 to 2023. The increase among women was largest in lower non-manual workers and the unemployed, and by 2023 these two groups had clearly the highest prevalence of LTSA based on mental disorders of all socioeconomic groups. Among men, the increase was largest among lower non-manual workers, the unemployed and students, but the overall prevalence was lower than among women.

There was a clear increase for LTSA due to mood disorders, especially among women, and the unemployed. The prevalence of mood disorders was higher than the prevalence of anxiety disorders or other mental disorders in 2010.

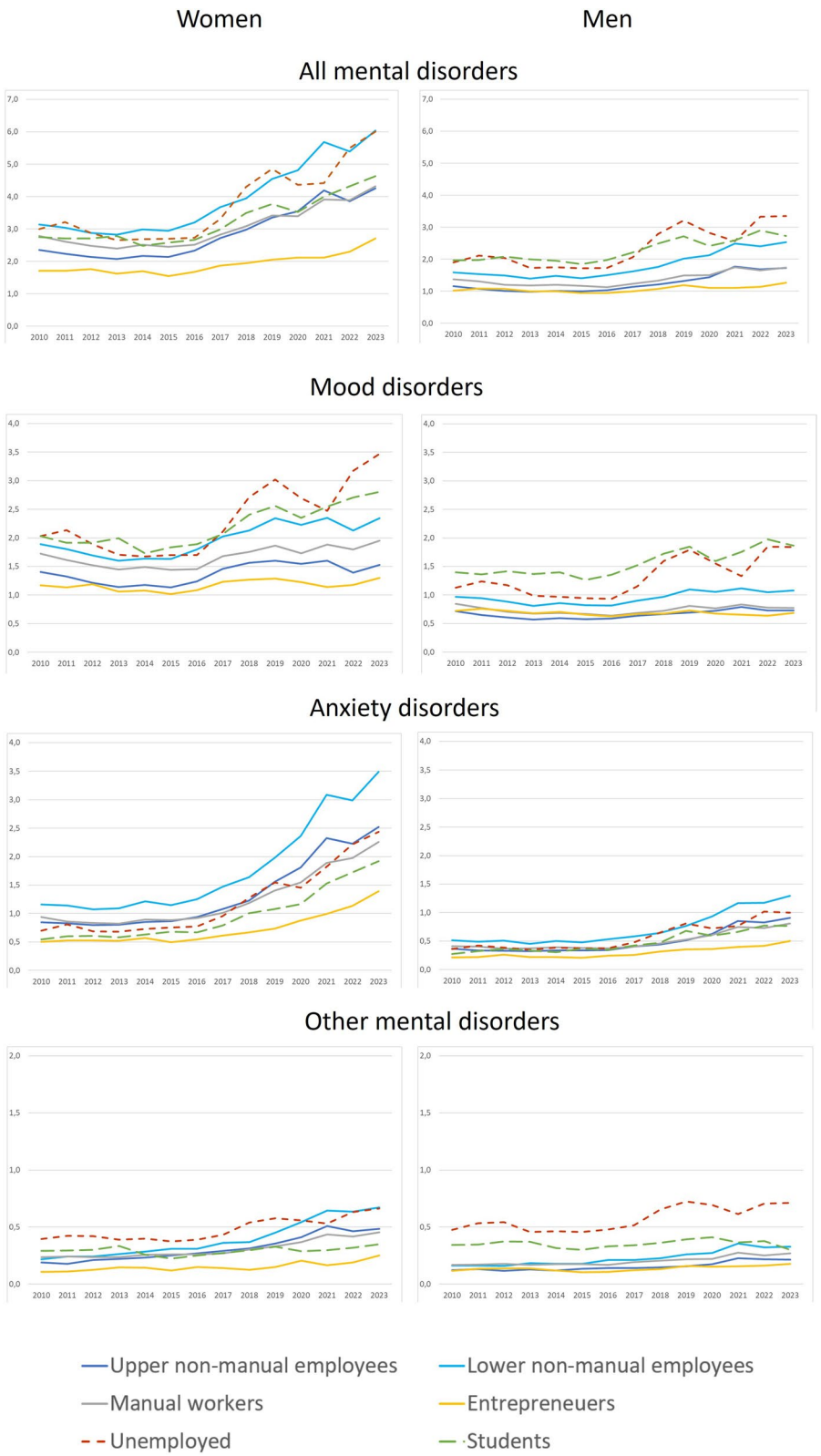

Fig. 1 Age group-standardized sickness absence prevalence based on mental disorders according to diagnostic group and socioeconomic group among Finnish women and men in 2010–2023

During the study period, the prevalence of LTSA increased the most in women's LTSA due to anxiety disorders. This increase was prominent in all socioeconomic groups but especially among female lower non-manual employees. Among women, due to this increase in anxiety disorders, by 2023 the prevalence of the two major diagnostic groups was much closer to each other than in 2010. As there was a parallel but much less steep increase in LTSA due to anxiety disorders among men, by 2023 the sex difference for this diagnosis group was particularly explicit. For the other mental disorders, no such increase emerged. As an exception, for unemployed men the prevalence somewhat increased during the follow-up years.

Relative adjusted socioeconomic group differences in LTSA prevalence

Table 2 shows the adjusted relative risks (RR) for the yearly LTSA prevalence according to socioeconomic group for years 2010 and 2023, first and last year of our study period. Differences in age, marital status, and educational level were adjusted for in the models separately for both years. Upper non-manual employees were set as the reference group in each model. The non-adjusted relative risks are presented in a Supplementary Table.

The adjusted relative risk of having LTSA due to any mental disorder was higher among lower non-manual employees compared to upper non-manual employees for both sexes and in both time points. Among women, this group had the highest RRs of all socioeconomic groups in both time points. Among men, while the RRs were high among lower non-manual employees, in both time points the RRs were highest among the unemployed. Manual workers had somewhat lower, and entrepreneurs clearly lower RRs compared to upper non-manual employees. Students had a lower RR compared to upper non-manual employees among women, but a higher RR among men.

For all mental disorders, some differences between socioeconomic groups grew larger over time: The higher relative risks of lower non-manual employees and the unemployed in comparison to upper non-manual employees increased from 2010 to 2023.

Looking at the prevalence of LTSA due to mood disorders, while the RR was high for lower non-manual employees as well, the highest RRs in 2023 were found among the unemployed and students both among women and men. For male students, the RR in 2023 was as much as twofold compared to upper non-manual employees. For both sexes, these RRs of lower non-manual employees, unemployed and students increased considerably from 2010 to 2023. Among women, the unemployed and students' RRs for LTSA due to mood disorders changed from having no relative risk to having a much larger risk than upper non-manual employees in 2023.

The adjusted relative socioeconomic differences in the prevalence of LTSA due to anxiety disorders were more stable, and quite similar between sexes. The RRs were highest among lower non-manual employees compared to upper non-manual employees for both sexes and in both time points. Contrary to mood disorders, here students had a clearly lower prevalence risk than upper non-manual employees. The relative risk among entrepreneurs was especially low for LTSA due to anxiety disorders.

For LTSA due to other mental disorders, the RRs compared to upper non-manual employees were highest among the unemployed, although they decreased from 2010 to 2023. For students the relative risk compared to upper non-manual employees also decreased between 2020 and 2023, and among women even changed from a higher RR to a lower RR in 2023.

Discussion

In this study we aimed to provide an up-to-date view on how long-term sickness absence (LTSA) prevalence based on mental disorders has developed in different socioeconomic groups, whether attached to or outside employment. The need for understanding the rise of mental disorders and consequent work disability is huge in today's world.

A substantial rise in LTSA based on mental disorders

Examining LTSA prevalence from 2010 to 2023 in Finland, our first main finding shows a substantial increase in absences based on mental disorders. The high prevalence and increase has been shown also previously [5, 6, 10], as has the decrease in LTSA during covid-19 pandemic in Finland [54], but this study for the first time draws a trend from 2010 to current post-covid situation. Our results show an increase in all socioeconomic groups except male entrepreneurs. The prevalence of LTSA caused by mental disorders has continued to increase steeply after a temporary decrease during covid-19 pandemic, and the rise has been especially grave among women, whether they are employees, unemployed or students.

The increase was particularly strong in long-term sickness absences due to anxiety disorders among lower non-manual female employees, a considerably large wage earner group. Female lower non-manual employees include for example social and health-care professionals such as nurses and pre-school educators. These occupations often have non-ideal psychosocial working conditions to begin with [55], and during the covid-19 pandemic they faced a notable work strain

Table 2 Adjusted relative risks (RR) for the socioeconomic groups' yearly sickness absence prevalence of 2010 and 2023, separately for sexes and diagnosis groups

	Women				Men			
	2010		2023		2010		2023	
	RR	99% CI	RR	99% CI	RR	99% CI	RR	99% CI
All mental disorders								
Upper non-manual employees	1.00		1.00		1.00		1.00	
Lower non-manual employees	1.13	1.09-1.16	1.25	1.22-1.27	1.20	1.14-1.26	1.30	1.25-1.35
Manual workers	0.93	0.90-0.97	0.87	0.85-0.90	0.96	0.91-1.01	0.85	0.82-0.89
Entrepreneurs	0.60	0.57-0.64	0.58	0.56-0.61	0.71	0.66-0.76	0.65	0.61-0.68
Unemployed	1.01	0.96-1.05	1.21	1.18-1.25	1.30	1.23-1.37	1.57	1.50-1.64
Students	0.89	0.84-0.94	0.90	0.87-0.93	1.11	1.03-1.19	1.30	1.23-1.37
Mood disorders								
Upper non-manual employees	1.00				1.00		1.00	
Lower non-manual employees	1.09	1.05-1.14	1.29	1.25-1.34	1.19	1.11-1.27	1.29	1.22-1.37
Manual workers	0.92	0.87-0.96	1.05	1.00-1.09	0.96	0.90-1.02	0.89	0.84-0.94
Entrepreneurs	0.67	0.62-0.72	0.76	0.71-0.81	0.82	0.76-0.89	0.84	0.78-0.90
Unemployed	1.09	1.03-1.15	1.87	1.78-1.95	1.25	1.16-1.34	2.02	1.90-2.15
Students	1.01	0.94-1.07	1.41	1.34-1.48	1.23	1.13-1.35	2.01	1.87-2.16
Anxiety disorders								
Upper non-manual employees	1.00		1.00		1.00		1.00	
Lower non-manual employees	1.21	1.14-1.28	1.24	1.20-1.28	1.25	1.14-1.36	1.30	1.24-1.37
Manual workers	0.94	0.87-1.00	0.79	0.76-0.82	0.91	0.83-1.00	0.79	0.74-0.83
Entrepreneurs	0.51	0.46-0.56	0.51	0.48-0.54	0.44	0.39-0.51	0.50	0.47-0.55
Unemployed	0.68	0.63-0.74	0.85	0.81-0.89	0.81	0.72-0.90	0.93	0.87-1.00
Students	0.54	0.49-0.60	0.66	0.62-0.69	0.58	0.50-0.67	0.78	0.72-0.86
Other mental disorders								
Upper non-manual employees	1.00		1.00		1.00		1.00	
Lower non-manual employees	1.10	0.97-1.25	1.20	1.13-1.28	1.16	0.99-1.36	1.30	1.16-1.44
Manual workers	1.11	0.96-1.28	0.81	0.74-0.88	1.08	0.93-1.27	1.00	0.90-1.11
Entrepreneurs	0.48	0.37-0.61	0.47	0.41-0.54	0.73	0.59-0.90	0.66	0.57-0.77

Table 2 (continued)

	Women				Men			
	2010		2023		2010		2023	
	RR	99% CI	RR	99% CI	RR	99% CI	RR	99% CI
Unemployed	1.84	1.59-2.13	1.16	1.05-1.28	2.86	2.45-3.34	2.42	2.17-2.71
Students	1.41	1.19-1.66	0.75	0.66-0.84	1.84	1.54-2.21	1.20	1.03-1.40
N in models	**1,427,507**		**1,359,656**		**1,430,321**		**1,377,997**	

and mental health problems [56, 57]. In Finland these professions have moreover been targeted with financial pressure during recent economic downturn years, further increasing mental strain. Moreover, Mauno's et al. [58] study also suggests that recent years' intensified job demands may have an especially negative effects on occupational well-being in a hospital context.

Besides lower non-manual employees, also upper non-manual employees had a notable increase in LTSA due to anxiety disorders. Specialists, directors and managers have faced a high intensification of work, that challenges the benefits of job autonomy [59, 60]. Leaders and supervisors for their part have had a demanding task in leading work in the new economic and mobile circumstances driven by the covid-19 pandemic [61]. In addition, there are professions also among upper non-manual employees that faced high strain during the covid-19 pandemic, such as physicians and teachers.

The increase in LTSA prevalence was also very apparent for absences due to mood disorders among students and the unemployed, the latter especially among women. This result is alarming considering their chances for a stable attachment to, or re-entering employment. The increased prevalence of depressive symptoms during covid-19 pandemic among young persons [39, 62] and higher education students [38] apply to students of adult age as well, and has led to increasing work disability, shown now by our results. While not unique to students, the reasons for increased mental ill-health during the pandemic are certainly related to isolation (e.g. [63]), and disruption of studies as a crucial phase for individual goals and financial security. Our results also show that the increase in occupational disability due to mood disorders for students has continued after the pandemic. Post-pandemic development in mood disorders and subsequent work disability may be exacerbated by global economic turmoil, global warming and thus increased uncertainty for future. Of all socioeconomic groups in Finland, whether in or outside employment, student status has been associated with the highest risk for disability pensions due to all mental disorders and mood disorders [64].

There was also a substantial increase in LTSA due to mood disorders among the unemployed, especially women. Depression has repeatedly been found to be frequent among unemployed people [65]. For the unemployed, being outside employment, a loss of identity and social connections [66] and a general risk of ill-health [67, 68], can form a vicious cycle and an increasingly hopeless view on future prospects. This mechanism may be emphasized in the post-pandemic economic atmosphere. In Finland, a strong association between unemployment and future LTSA due to common mental disorders has been witnessed before covid-19 [33]. Vice versa, a mood disorder can of course increase the risk of unemployment. Our results show that mood disorders are increasingly linked to work disability among the unemployed. In any case, the increase is alarming on the account that both mental disorders [11–16], and unemployment status [23] are associated with long work disability periods.

Considering the increase in LTSA based on mental disorders in general, our study that shows it has taken place in almost all socioeconomic groups, strengthens the notion that there may be several collective societal and cultural factors driving this change. These phenomena include at least generally increased work pace and strain throughout professions, medicalization and psychologization of subjective sensations, decreased stigma related to mental problems, and possible changes in clinical practices.

The temporary decrease in LTSA prevalence during covid-19 pandemic is not of central attention in this study, but can be explained by underuse of health services during the lockdown and the temporary permissions given for employees to self-report sickness absences with full salary.

Clear and partly widened socioeconomic gaps

Besides the increase in prevalence, our findings show clear but also partly changed relative risks among socioeconomic groups for LTSA based on mental disorders. We examined relative risks between socioeconomic

groups at baseline 2010 and at the last focal year 2023, adjusting for differences in demographic factors and educational level. As a central finding, the differences between socioeconomic groups grew larger**:** The higher relative risks for LTSA based on mental disorders in lower non-manual employees in comparison to upper non-manual employees increased slightly further from 2010 to 2023. For lower non-manual employees, the covariate-adjusted relative risk slightly grew in both sexes in all three diagnostic groups. Besides social and healthcare professionals, lower non-manual employees also include professions such as administrative assistants, lower-level specialists and police officers. In addition to the strain during covid-19 and a general intensification of job demands, at least current economic recession and accelerated digitalization [69] may have added mental strain for lower non-manual employees. Among Finnish occupational classes, lower non-manual employees have reported most strain from high work pace, and lowest autonomy concerning work load or pace [55]. The increased gap between lower and upper non-manual employees may also highlight a relatively advantaged current situation for the upper non-manual employees, despite the simultaneous rise in LTSA based on mental disorders. Highest socioeconomic groups are persistently associated with better general health [70], more favourable health behaviour [71], better psychosocial and physical working conditions at work [18], and more frequent use of psychotherapy [72]. With an intensification of job demands across professions, these protective factors may play an increasing role, and partly explain the widened gap between upper and lower non-manual employees in LTSA due to mood disorders.

For the unemployed, a higher relative risk of LTSA due to mood disorders in comparison to upper non-manual employees increased further from 2010 to 2023. This change might be affected by the general economic situation, and changes in unemployment benefit conditionality and activation policies [73]. As long-term unemployment increased in Finland during our follow-up [74], that might both increase not only ill-health and work disability among the unemployed, but also their incentive to apply for sickness allowance or disability pension for financial security [75].

Adjusting for covariates partly changed the order of the groups in terms of LTSA risks. While age-group-standardized trends showed a slightly higher or at least similar risk of LTSA based on a mental disorder for manual workers compared to upper non-manual employees, covariate-adjusted modelling revealed an actually slightly lower relative risk. This is in contrast to some previous studies on socioeconomic differences in work disability benefits [26, 27, 64, 76]. Despite many manual occupations were negatively affected by the 2022 recession, this occupational group might have some favourable work qualities compared to non-manual employees. Of Finnish occupational classes, manual workers have reported highest satisfaction in workplace social climate, lowest strain form working pace and least fear of either being laid off or developing burnout [55]. Although working life is data-intensive and mentally demanding currently in almost any field of work, this new finding drives to reversely ask whether upper non-manual employees may have witnessed greater mental demands at work during last 15 years than manual wage earners.

For entrepreneurs, our results showed the lowest prevalence and a consistent lower relative risk compared to upper non-manual employees. The lower RR applied particularly to LTSA due to anxiety disorders. The increase in LTSA based on mental disorders could be only seen among women. Willeke et al. [28] in their systematic review, have showed a lower prevalence of mental disorders for self-employed persons compared to employees or no differences between the groups in most recent European studies. However, the review also showed that the results greatly vary according to national data sets and study settings. Reasons why there can be less diagnosed mental disorders or related sickness absences for entrepreneurs, are various. Besides a possible health and work orientation selection of this group, entrepreneurship may entail a strong financial pressure leading to a tendency to work while sick.

All in all, despite the group differences, our results show a significant increase in LTSA based on mental disorders in most socioeconomic groups. To curb the increasing trend, it is evident that non-manual employees need better support coping with the multifold mental job demands and boundless autonomy presented by todays intensified knowledge-work [77]. The mental health problems of students must be tackled with multiple methods, varying from mental health literacy to self-management skills for digital consumption. As for the long-term unemployed, early low-threshold services are the key for preventing ill mental health caused by cumulative health, social and financial risks.

Strengths and weaknesses

We were able to compare LTSA trends of multiple socioeconomic groups, both those in an employed position and those outside employment using up-to-date register data that is highly reliable and objective, with no self-report bias and no loss to follow-up. Making the socioeconomic comparison, we were able to control for both demographic variables and particularly the educational level of the groups, thus eliminating some confounding factors behind group differences. Our study is

not without limitations, however. We could not control for several possible confounding factors such as individual health-related factors preceding LTSA or variation in availability of services. How our results apply to other national contexts is also not clear. We could only speculate on how the recent economic recession and global work trends might have affected socioeconomic groups' relative risks for mental health and sickness absences as well: The increased role of digital technology and mobile work both may have differing effects on mental health and work ability depending on the occupational class or complexity of job requirements [78, 79], but the mechanisms might be complex, and vary across area [80], professions and field. The four employed occupational classes in our study cover many professions and job skill requirements. For example, among manual workers, there is a huge scale of mental health risks depending on job skill requirements [76].

Conclusions

In our population-based observational register study, we detected increased prevalence of long-term sickness absence based on mental disorders in Finland in all socioeconomic groups, whether they are different occupational classes, unemployed or students. Depending on the socioeconomic group and sex, the increase was largest due to either mood or anxiety disorders. Register data also revealed group differences in these trends. Employees, but also students and unemployed persons, need support to curb the increase in LTSA based on mental disorders.

Abbreviation

LTSA Long-term sickness absence

Supplementary Information

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Supplementary Materials 1.

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Not applicable.

Authors' contributions

RP, and JB contributed to the planning and conducting the study. RP wrote first and successive drafts of the manuscrips, conducted the statistical analyses. JB contributed in writing and revising the manuscript, and advised on statistical modeling. Both authors interpreted the results and approved the final version of the manuscript.

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Data availability

There are legal restrictions that prevent from sharing data publicly. Pseudonymised data cannot be openly shared since use of sensitive individual-level health data is strictly regulated by law (manuscript references [50, 53]) and the data providers have not given permissions for further data sharing.

Declarations

Ethics approval and consent to participate

The study used secondary data retrieved from registers, and no human subjects were contacted to collect the data. According to the General Data Protection Regulation of the EU [49] and the Finnish Data Protection Act [50], processing of personal data is permitted without informed consent for a task carried out in the public interest, such as scientific research. In Finland, an ethical review statement is not required for studies based solely on administrative register data [51]. We followed good scientific practice, data protection guidelines and ethical standards [51] and in compliance with the Helsinki Declaration [52] in collecting and analysing the data and in reporting the results. The data were fully pseudonymised by the data providers, and the researchers had no access to the personal identifiers of the study subjects.

Consent to Publication

Not applicable.

Competing interests

The authors declare no competing interests.

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