Occupational class and the changing patterns of hospitalization for affective and neurotic disorders: A nationwide register-based study of the Finnish working-age population, 1976–2010

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Abstract

Purpose This study aimed to examine the long-term changes and socioeconomic disparities in hospitalization for affective and neurotic disorders among the Finnish working-age population from 1976 to 2010.

Methods Register-based study, consisting of a five-year follow-up of 3 223 624 Finnish working-age (18- to 64-year old) individuals in seven consecutive cohorts. We calculated the hazard ratios of psychiatric hospitalization for different occupational classes using Cox regression models.

Results The risk of hospitalization for affective and neurotic disorders increased in all occupational classes after the economic recession in the 1990s, and then decreased in the 2000s. Before the 2000s, the risk was the highest among manual workers. In the 2000s the disparities between upper-level non-manual employees and other occupational classes increased. Hospitalization rates remained high among female manual workers and non-manual lower-level employees.

Conclusions This study revealed important similarities and differences between occupational classes in terms of long-term changes in hospitalization for affective and neurotic disorders. The results suggest that the labor market changes and healthcare reforms during the 1990s and 2000s in Finland have been more beneficial for higher than for lower occupational classes.

Compliance with ethical standards This study was approved by the Ethics Committee of the Finnish Institute of Occupational Health.

Introduction

Various register-based indicators have shown a considerable growth in the treatment of psychiatric problems among the Finnish working-age population after the early 1990s. Most of this growth has been related to affective and neurotic disorders, a trend that has often been associated with the more intense and uncertain labor markets that followed the major recession of the 1990s [1,2].

The changes that have taken place in Finnish society since the 1990s have had an uneven effect on the different segments of the labor force. The number of job opportunities available for manual workers has decreased, whereas the demand for skilled non-manual workers has increased [3]. At the same time, income inequality has increased and the cuts in social spending and changes in the healthcare system may have negatively affected the lower socioeconomic groups in particular [4–6]. Previous studies have shown that mental disorders are associated with socioeconomic differences, and that lower socioeconomic status leads to a higher risk [7–11]. It is therefore possible that the changing role of psychiatric disorders and the developments in Finnish society since the 1990s are associated with widening health disparities in affective and neurotic disorders.

However, because most studies on mental health disparities are based on relatively short time periods or single cohorts, little is known about the possible long-term effects of societal changes on mental health disparities among working populations. One important outcome affected by socioeconomic position is psychiatric hospitalization [12, 13]. A recent study of the Finnish working-age population suggested that the socioeconomic disparities in psychiatric hospitalization indeed began to increase during the 2000s [14], even though another study in the same population showed that overall psychiatric hospitalizations actually

decreased during this period [15]. However, these two studies involved all psychiatric diagnoses and paid no specific attention to affective and neurotic disorders, which are the most relevant categories affecting the mental health of working populations. In order to examine the changing patterns of socioeconomic disparities, we must concentrate on these diagnostic categories.

The aim of this study was to examine the changing patterns of hospitalization for affective and neurotic disorders among the Finnish working-age population during the period from 1976 to 2010. We examined both the historical trends in the risk of hospitalization as well as the changes in socioeconomic health disparities, using occupational class as an indicator of socioeconomic status. Previous studies have noted the important role of occupational class in socioeconomic health disparities among working populations [16]. Our research questions were as follows: 1) Have psychiatric hospitalizations for affective and neurotic disorders increased among different occupational classes during the study period? 2) Have health disparities between occupational classes increased?

Methods

Study population

The present study extends over a 35-year period from 1976 to 2010. In order to analyze the changing risk profiles of different occupational classes, the total study period was divided into seven five-year time periods (1976–1980, 1981–1985, 1986–1990, 1991–1995, 1996–2000, 2001–2005, and 2006–2010). Data were provided by Statistics Finland, whose database contains information on every resident in Finland, and information on gender, age, marital status, region, and occupational class at the start of each time period. The data also included death dates where applicable. The length and starting point of each time period were

determined by Finnish censuses which, for much of the study period, were the source for several study variables.

We constructed seven consecutive cohorts by randomly selecting 25% of the Finnish working-age population (aged 18–64) with a recorded occupational title at the start of each time period. To comply with the national Personal Data Act, data selection was performed by Statistics Finland and personal identification numbers were removed from the data before the analyses. This anonymization meant that individuals could not be tracked from one cohort to another. However, according to our estimation, the steady 11% overlap between consecutive cohorts that we found affected all cohorts similarly and had only a minor effect on the overall results. The same data have been previously used to examine the changes in the risks of hospitalization among the Finnish working-age population [14, 15].

We split the participants of each cohort into three age groups (18–34 years, 35–49 years, and 50–64 years), an age classification commonly used in studies on mental health [17, 18]. The marital status variable included four categories (single, married, divorced, and widowed), and the region variable included the current 19 regions (in Finnish: *maakunta*) of Finland. Information on occupational class was derived from the Census until 1985, and from 1987 onwards from Statistics Finland's multi-register data [19].

We divided the occupational groups into three occupational class categories using Statistics Finland's 1989 classification of socioeconomic groups, which is based on the statistical recommendations issued by the United Nations for the 1990 Population Censuses, although it does not fully comply with these. The three occupational classes included: upper-level non-manual employees with administrative, managerial, professional and related occupations;

lower-level non-manual employees with administrative and clerical occupations; and manual workers [20]. Entrepreneurs were excluded from the data.

The proportion of employees or wage earners with a recorded occupational title has remained at around 60% of the total Finnish population of 18–64-year-olds, except in Cohort 1996–2000, in which the proportion was as low as 51% due to the severe recession of the early 1990s. Therefore, the proportion of the cohort population in relation to the total population of 18–64-year-olds has remained around 15%, decreasing to 13% for Cohort 1996–2000. In total, the study population consisted of 3 223 624 cohort members, of which 1 632 297 (51%) were men and 1 591 327 (49%) women. The study population included 565 682 (18%) upper-level non-manual employees, 1 229 081 (38%) lower-level non-manual employees, and 1 428 861 (44%) manual workers (see Table 1 for more detail).

(Table 1 here)

Hospitalization data

We obtained data on hospital diagnoses from the National Hospital Discharge Register (NHDR), which is updated and monitored for quality by the National Institute for Health and Welfare, and has been shown to adequately cover hospital visits and accurately record them, especially as regards primary diagnoses [21, 22]. The data consisted of information on medical treatment cases in all Finnish public sector hospitals, including hospital admission and discharge dates and primary diagnoses. In the analysis, we formed a category for mental disorders using the International Classification of Diseases (ICD), Eight and Ninth Revision codes 296 and 300, and the International Classification of Diseases, Tenth Revision codes F30–F48. For each individual, the diagnosis data were linked to Statistics Finland records by

a personal identification number. This identification number is a unique number that all Finnish citizens are given at birth, and new permanent residents are given when they receive a residence permit. It is used for all contact with welfare and health care organizations.

Statistical analysis

In this study, we followed up the NHDR data of the participants from each of the seven cohorts for a five-year period. The first register follow-up of hospitalizations started on 1 January 1976 and ended on 31 December 1980 for the first cohort. The follow-up for the second cohort started the next day. The follow-up for the seventh cohort started on 1 January 2006 and ended on 31 December 2010. For each individual, the follow-up ended on the day that the individual was either hospitalized or died, or at the end of the follow-up period, whichever came first. Due to our reliance on quinquennial censuses, we were unable to follow changes in marital status, region or occupational class during the five-year period. However, we believe that the error caused by this is minor [23, 24].

Statistical analyses were conducted using the Cox regression models. First, in order to describe the absolute differences between the occupational classes' hospitalizations for affective and neurotic disorders, we produced unadjusted incidence rates (cases per 10 000 person-years) for the three occupational classes in each cohort. We also used the Cochran–Armitage test for trend to examine potential trends in the incidence rates over the follow-up period. Second, to examine the long-term changes in the risk of hospitalization, we calculated the age, marital status and region-adjusted hazard ratios (HRs) and their 95% confidence intervals (95% CI) between 1981 and 2010 in relation to the earliest cohort (1976–1980) within each occupational class. Third, to analyze the changes in health disparities, we calculated similarly adjusted HRs for lower-level non-manual employees and manual workers

in relation to upper-level non-manual employees in each cohort. All analyses were stratified by gender. We used the SAS 9.4 (SAS Institute, Inc, Cary, NC, USA) software package to perform the analyses.

Results

Altogether 21 901 psychiatric hospitalizations were recorded in 1976–2010, of which 10 552 involved men and 11 349 women. The total number of cases for upper-level non-manual employees was 3355, for lower-level non-manual employees 7831, and for manual workers 10 715. The numbers of psychiatric hospital admissions in the sex- and occupational class-specific groups per cohort varied between 85 and 1038, the average being 521 cases. Mean follow-up time was 4.96 years.

(Figure 1 here)

Incidence rates

As shown in Figure 1, the incidence of hospitalization for affective and neurotic disorders did not remain constant. The Cochran–Armitage test for trend showed that, apart from male upper-level non-manual employees, there was an upward trend in all occupational classes among both men and women. In all occupational classes, the incidence rates decreased or remained relatively stable from 1976 to 1990. During the 1990s the incidence rates in all occupational classes increased. In some groups, the incidence rate started to decrease in Cohort 2001–2005, most notably among male upper-level non-manual employees. In other groups, excluding female upper-level non-manual employees, the increase in incidence rates was less notable than during the previous decade. In the last cohort (2006–2010), the incidence rates decreased in all groups, returning to their pre-1990s level among male upper-

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level non-manual employees, but remaining high among women. The rates were highest among manual workers throughout the study period, and lowest among upper-level non-manual employees, in most cohorts. In most cohorts, the rates were higher for women than men within the same occupational class.

(Table 2 here)

Comparisons between cohorts

Table 2 displays the age, marital status and region-adjusted proportional HRs for the three occupational classes. The sex-stratified occupational class groups of Cohort 1976–1980 were used as reference groups, so that the HRs of this cohort were contrasted with the results of the subsequent cohorts. As with the incidence rates, the time trends showed that the risk of hospitalization remained relatively stable in most groups until the 1990s. The risks increased significantly in Cohort 1996–2000, ranging from 1.19 (95% CI 1.09–1.31) among male manual workers to 1.39 (95% CI 1.15–1.69) among male upper-level non-manual employees. In Cohort 2001–2005, the risk remained high in all other groups apart from male upper-level non-manual employees. In the last cohort (2006–2010), the risk decreased in all study groups. Among the male upper-level non-manual employees in this cohort, the risk decreased (HR 0.73; 95% CI 0.60–0.90) in comparison to those in Cohort 1976–1980, while there was no statistically significant difference between the other male groups in the first and last cohort. Among women, the HRs remained high among manual workers (HR 1.30; 95% CI 1.16–1.47) and lower-level non-manual employees (HR 1.28; 95% CI 1.15–1.42), but there was no statistically significant difference between the upper-level non-manual employees in the first and last cohort.

Disparities between occupational classes

Table 3 presents the age, marital status and region-adjusted proportional HRs for manual workers and lower-level non-manual employees in relation to the upper-level non-manual employees, separately in each of the seven cohorts. The table shows that there were no statistically significant differences between upper-level and lower-level non-manual employees until the 2000s. Among women, the HRs remained higher among manual workers, in all cohorts. Among men, the risk was higher for manual workers except in Cohort 1986–1990 and in Cohort 1996–2000.

(Table 3 here)

After 2000, the HRs for male lower-level non-manual employees suddenly increased, rising to 1.20 (95% CI 1.04–1.39) in Cohort 2001–2005, and 1.39 (95% CI 1.19–1.64) in Cohort 2006–2010. A similar trend was observable among manual workers. While there were no statistically significant differences in Cohort 1996–2000, the risk among manual workers increased to 1.40 (95% CI 1.23–1.59) in Cohort 2001–2005 and to 1.55 (95% CI 1.34–1.78) in Cohort 2006–2010.

Among women, the increasing disparities were observable in only the last cohort (2006–2010). While there were no statistically significant differences between upper-level and lower-level non-manual employees in Cohort 2001–2005, and the HR for manual workers (HR 1.22; 95% CI 1.07–1.38) was lower than in any other cohort, the HR for lower-level non-manual employees increased to 1.18 (95% CI 1.04–1.33) and to 1.52 (95% CI 1.33–1.74) for manual workers in Cohort 2006–2010, which was the highest HR during the research period.

Discussion

The results of this study showed that hospitalization for affective and neurotic disorders was more likely among manual workers than non-manual upper-level employees during most of the period from 1976 to 2010. This may indicate a higher psychiatric morbidity, which might stem from, for example, more adverse working conditions, economic deprivation, lower control over organizational assets, greater job insecurity, and less healthy lifestyles [25, 26]. It may also be the result of uneven access to mental health services [27, 28] or selective processes, as mental health problems in early age may lead to lower socioeconomic position [29].

However, the results also showed important temporal changes in the patterns of hospitalization. The risk of hospitalization started to increase in all study groups during the 1990s despite stagnant levels in overall psychiatric hospitalizations [15] and the changing health care policies and treatment practices that from the 1980s onwards have reduced the number of psychiatric hospital beds and stressed primary health care responsibility and outpatient treatment [30–32]. This suggests that the societal changes that took place in Finland during this period created a strong demand for healthcare services related to affective and neurotic disorders, and that their proportion of all psychiatric hospitalizations increased. It is interesting that the increase in hospitalizations took place around the same time as similar trends were observed in several other indicators of psychiatric morbidity, such as mental health-related sickness absence and disability pensions [1, 2].

On the other hand, the risk of hospitalization for affective and neurotic disorders started to decrease again in the 2000s, especially among upper-level non-manual employees. This

reduction was simultaneous with a decline in overall psychiatric hospitalizations [15] and it suggests that these disorders may have been increasingly treated in other healthcare institutions. The decrease in hospitalizations was also associated with widening disparities between the socioeconomic groups, as the reduction was less significant among manual workers and lower-level non-manual employees.

There are several potential explanations for these widening disparities. One is related to increased inequality in access to healthcare services. It has been argued that the changes in the Finnish mental health care system are likely to have benefited people who are more prosperous [6]. Social spending cuts have increased the waiting times in public mental health services and the costs carried by the patients themselves have increased [14]. For example, public funding for psychotherapy has become more strictly limited in duration and intensity from 2003 onwards, with the patients themselves carrying the costs of more comprehensive therapy [33]. This has especially affected those from poorer socioeconomic backgrounds who use public mental healthcare service more commonly than others [34]. Those with higher socioeconomic status may be able to better afford long treatment periods and have access to private psychotherapy with shorter waiting times [35].

The reduction in hospital treatment and a greater emphasis on outpatient treatment may also have contributed to socioeconomic disparities. These changes have probably led to hospital treatment being increasingly provided to only the most severe cases of affective and neurotic disorders. Because severe mental disorders are strongly associated with socioeconomic factors, and because the role of selection is greater than with milder mental disorders [36], the changes in healthcare policies may have increased the proportion of inpatients from lower occupational classes.

The results could also be partly explained by labor market changes and economic factors. The period after the major recession in the 1990s has been associated with increasing income inequality and persistently high unemployment rates [37]. The job opportunities for upper-level non-manual employees have improved, but they have remained more stagnant for lower-level non-manual employees and even decreased for manual workers [3]. This may have created deprivation and mental health problems among certain segments of the population. On the other hand, the exceptionally low proportion of wage earners in Cohort 1996–2000 (immediately after the economic recession) may mean that part of the population with mental disorders was excluded from the workforce. Consequently, the improved employment rate during the post-recession period may have enabled the re-entry of mentally vulnerable populations back into the workforce. This may have caused higher hospitalization rates in lower socioeconomic groups [38].

Further examination of these explanations is limited by the study design. For example, the design does not allow for the analysis of cohort effects or for health-related selection of specific occupational classes. Potential shifts in diagnoses from milder to more severe cases cannot be determined because a further breakdown of the outcome would leave too few cases for statistical analysis. Additional research using a different design is needed to analyze the accompanying shifts in other types of health services such as outpatient treatment in public and private institutions, as well as in occupational healthcare. However, this study is unique in its ability to compare hospitalization patterns between consecutive cohorts and to examine the long-term developments in hospitalization for affective and neurotic disorders.

Conclusion

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This study showed that the risk of hospitalization for affective and neurotic disorders increased in all occupational classes in Finland in the 1990s and then decreased in the 2000s. It also showed consistent occupational class disparities in hospitalizations for affective and neurotic disorders throughout the research period from 1976 to 2010, and that these disparities increased in the 2000s. The disparities began to increase at the time the hospitalization rates among upper-level non-manual employees decreased. The hospitalization rates remained relatively high among female manual workers and lower-level non-manual employees. More research of the causal factors of this increasing disparity is needed, as this study suggests that it may be associated with changing healthcare policies and labor market inequality. More attention should be paid to the adequate availability of mental health services, especially to manual workers.

Compliance with ethical standards (Ethical standards statement here)

Conflict of interest The authors declare that they have no conflict of interest.

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Table 1 Descriptive statistics of study population in seven cohorts.

Figure 1 Sex- and occupational class-specific unadjusted incidence rates during five-year follow-up period in each cohort.

Table 2 Age, marital status and region-adjusted proportional hazard ratios by sex and occupational class among cohorts 1981–1985, 1986–1990, 1991–1995, 1996–2000, 2001–2005, and 2006–2010. Reference group, Cohort 1976–1980.

Table 3 Age, marital status and region-adjusted proportional hazard ratios by cohort, sex and occupational class, 1976–2010. Reference group, upper-level non-manual employees.