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Organizational change, psychosocial work environment, and non-disability early retirement: a prospective study among senior public employees
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To date, this is the most exhaustive study to examine voluntary early retirement behavior among senior public service employees exposed to organizational change and subsequent assessment of the psychosocial work environment on the work-unit level. Decision-makers should consider the impact of organizational change and the psychosocial work environment in strategies to maintain senior public employees in the labor market.

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Organizational change, psychosocial work environment, and non-disability early retirement: a prospective study among senior public employees

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Objective This study examines the impact of organizational change and psychosocial work environment on non-disability early retirement among senior public service employees.

Methods In January and February 2011, Danish senior public service employees aged 58–64 years (N=3254) from the Capital Region of Denmark responded to a survey assessing psychosocial work environment (ie, social capital, organizational justice, and quality of management). Work-unit organizational changes (ie, change of management, merging, demerging, and relocation) were recorded from January 2009 to March 2011. Weekly data on non-disability early retirement transfer were obtained from the DREAM register database, which holds weekly information about all public benefit payments in Denmark. Hazard ratios (HR) for early retirement following employees’ 60th birthday were estimated with Cox regression adjusted for age, gender, and socioeconomic status.

Results Exposure to change of management [HR 1.37, 95% confidence interval (95% CI) 1.13–1.66], mergers (HR 1.23, 95% CI 1.02–1.48), and relocation of work unit (HR 1.24, 95% CI 1.01–1.54) increased rate of non-disability early retirement, while demerging of work unit did not (HR 1.03, 95% CI 0.79–1.33). Work units with lower levels of social capital (HR 1.22, 95% CI 1.05–1.41), organizational justice, (HR 1.18, 95% CI 1.04–1.32), and quality of management (HR 1.14, 95% CI 1.02–1.25) increased rate of early retirement.

Conclusion Organizational change and poor psychosocial work environment contribute to non-disability early retirement among senior public service employees, measured at work-unit level.

Key terms ageing; Denmark; organizational restructuring; older worker; public sector; retirement behavior.
In the period 2011–2012, the nominal pension age in Denmark was 65 years when the government-paid old-age pension could be claimed and, before the age of 65, retirement was possible via disability or early retirement benefit. Disability benefit could be received in the age range 18–64 years, mainly on health grounds (mental as well as physical). Eligibility for early retirement benefit is unrelated to health and could be claimed from the age of 60–64 by anyone insured for a long time in an unemployment insurance fund. At the end of 2012, 34% of women and 27% of men aged 60–64 years received early retirement benefit.

The primary aim of this study was to investigate how organizational change is related to subsequent transition to early retirement benefit. A secondary aim was to investigate how the psychosocial work environment affects early retirement and the association between organizational change and early retirement.

Methods

Study sample and design

This study was a prospective cohort study of employees in the Capital Region of Denmark, and the study endpoint was retirement through the early retirement benefit program. The source population was all employees in the Capital Region of Denmark who were invited to participate in a questionnaire-based survey of well-being and work environment from 12 January 2011 to 9 February 2011. Among a total of 35 560 employees, 28 820 (81%) responded to the survey. Employees were organized in 2761 work units, where a work unit is defined as a group of employees with reference to a specified manager or head of unit. Data on organizational change from 1 January 2009 to 31 March 2011 were collected via an internet-based survey, in which all heads of work units were contacted (response rate 68.5%). The final study population included employees eligible for early retirement benefit, ie, aged 60–64 years for at least one week during the follow-up period from 4 April 2011 to 31 December 2012. The study sample comprised 3254 employees after excluding those who were already retired or had died before start of follow-up, were employed in a flexible job (for people with reduced ability to work), or had missing values on the baseline covariates.

Organizational change and the psychosocial work environment

Data on organizational change included information about change of management, merging, demerging, and relocation. Data were recorded at the work-unit level and linked to each employee in the work unit.

In the well-being and work environment survey, 44 items were related to the psychosocial work environment of the work unit. Altogether, 35 items were retrieved from the Copenhagen Psychosocial Questionnaire, second version (19), and the regional human resource departments, management, and employee representatives edited the remaining convenience questions. Since psychosocial work environment was not measured using established and validated scales, a research group including three specialists in occupational medicine categorized selected items into three composite scales for purposes of the present analyses. Survey items about the psychosocial work environment were all ordinal with 5 or 7 response categories. Three composite scales of psychosocial work environment were constructed: (i) organizational justice (6 items, Cronbach’s α 0.89), (ii) quality of management (4 items, Cronbach’s α 0.86), and (iii) social capital (8 items, Cronbach’s α 0.84) (see appendix for construction of scales, www.sjweh.fi/index.php?page=data-repository). The scales ranged from 0–100 with higher values representing a more positive evaluation of the psychosocial work environment.

In the present study, we focused on an aggregated measure of psychosocial work environment within work units, where employees were expected to have similar psychosocial working conditions rather than individual perceptions. Individual-level scores were computed as the mean of non-missing item responses and rescaled to 0–100 and work-unit-level scores were subsequently computed as the mean score for each work-unit and assigned to all employees within that unit, including non-respondents. The work-unit-level scores were based on responses from all employees of all ages and recorded as missing if data were available for <50% of items (individual level) or employees (work-unit level). Table 1 shows the distribution of work units and employees by work unit size.

Covariates

Age, gender, and socioeconomic factors were potential confounders for the association between the psychosocial work environment and early retirement. From the region’s registers we obtained information on work-unit affiliation,

Table 1. Number of employees distributed by work-unit size.

| Number of employees in unit | 1–5 | 6–15 | 16–30 | >30 | Total |
|-----------------------------|-----|------|-------|-----|-------|
| Employees all ages          | 2575| 1312 | 10674 | 9209| 35560 |
| Respondents                 | 2256| 10473| 9238 | 6883| 28820 |
| Employees 60–64 years       | 369 | 1549 | 1460 | 865 | 4234  |
| Employees in study sample   | 241 | 1241 | 1086 | 706 | 3254  |
occupational group, and gender for all participants. This information was linked to national registers containing information on age (continuous), gross personal income in 2010, gross household income in 2010, hospitalization in 2010 (yes/no), and civil status (single/married). Income categories were formed by dividing participants into four groups of approximately equal size.

Non-disability early retirement

Data on non-disability early retirement were obtained from the DREAM database, which holds weekly information about all public benefit payments in Denmark. For each participant, we recorded the first week receiving early retirement benefit. Participants who turned 65 years, died, emigrated, were on long-term sick-leave or started a flexi-job were censored.

Statistical analysis

Participants were followed from 4 April 2011 or their 60th birthday, whichever came last, to first payment of early retirement benefit, censoring or end of study, whichever came first. We estimated hazard ratios (HR) and 95% confidence intervals (95% CI) using Cox proportional hazards regression to study the association between early retirement and (i) organizational change, and (ii) psychosocial work environment using work-unit mean values.

The association between each of the four binary (organizational change) and three continuous (psychosocial work environment) explanatory variables and the outcome was evaluated in separate Cox regression models. All analyses were adjusted for age by setting the outcome was evaluated in separate Cox regression analyses (adjusted for age, gender, and socioeconomic status). Finally, the associations between each type of organizational change and early retirement were adjusted for all psychosocial work environment scales in addition to baseline covariates, and vice versa.

Results

Table 2 shows the distribution of the study sample and the prevalence of organizational change and early retirement across covariate levels.

| Total | Experienced change | Retired |
|-------|---------------------|--------|
| N     | %                   | N     | %     |
| Gender |                     |       |
| Female | 2446                | 75.2  | 1078  | 65.8  |
| Male   | 808                 | 24.8  | 366   | 64.4  |
| Age at 4 April 2011 (years) |       |
| 58–59  | 1181                | 36.3  | 525   | 67.2  |
| 60–61  | 1468                | 45.1  | 658   | 64.6  |
| 62–63  | 329                 | 10.1  | 130   | 60.7  |
| 64     | 276                 | 8.5   | 131   | 68.2  |
| Medical diagnosis in 2010 Yes |       |
| 1396   | 42.9               | 617   | 64.7  |
| No     | 1858                | 57.1  | 827   | 66.0  |
| Civil status Single |       |
| 1079   | 33.2               | 478   | 66.3  |
| Married/cohabiting |       |
| 2175   | 66.8               | 966   | 65.1  |
| Occupational group |       |
| Nurses | 654                 | 20.1  | 316   | 70.9  |
| Medical doctors & dentists | 344 | 10.6  | 153   | 64.8  |
| Social & healthcare workers | 463 | 14.2  | 236   | 74.9  |
| Other healthcare workers | 348 | 10.7  | 172   | 70.8  |
| Laboratory technicians | 242 | 7.4   | 74    | 64.0  |
| Administrative staff | 755 | 23.2  | 314   | 66.2  |
| Technical/service staff | 448 | 13.8  | 152   | 66.2  |
| Personal income 2010 (gross, dkr.) |       |
| <325 000 | 828              | 25.4  | 357   | 62.9  |
| 325 000–375 000 | 817  | 25.1  | 360   | 64.4  |
| 375 000–450 000 | 827  | 25.4  | 377   | 67.3  |
| >450 000 | 782             | 24.0  | 350   | 67.4  |
| Household income 2010 (gross, dkr.) |       |
| <450 000 | 943              | 29.0  | 402   | 64.9  |
| 450 000–700 000 | 897  | 27.6  | 402   | 65.8  |
| 700 000–950 000 | 793  | 24.4  | 344   | 63.1  |
| >950 000 | 621             | 19.1  | 296   | 68.7  |
| All respondents | 3254  | 100  | 1444  | 65.5  |

(46.0%) and technical/service staff (54.1%). During the follow-up period, 525 women (21%) and 117 men (14%) retired early. Retirement was frequent (17–26%) among all occupational groups except medical doctors and dentists (2%).

In crude Cox regression analyses (table 3), we found that the rate of early retirement was significantly higher among employees who experienced change of management, namely a 32% increase (HR 1.32, 95% CI 1.09–1.59). The same was true for employees who experienced merging of units with a 23% increased rate (HR 1.37, 95% CI 1.13–1.66), while the effect of merging work units remained unchanged compared to crude analyses (HR 1.23, 95% CI 1.01–1.49). Employees who experienced relocation of work-unit retired at a 10% higher rate when adjusted only for age and this was not significant (HR 1.10, 95% CI 0.89–1.35) but the rate was 25% higher in the adjusted model (HR 1.25, 95% CI 1.01–1.54). In adjusted models that also included the
The adjusted analyses of organizational change provided in this paper showed that Danish senior public employees who experienced change of management, or merging or relocation of work units had a higher rate of early retirement. Demerging of work unit was not related to early retirement. Adjusted analyses of psychosocial work environment showed that poorer social capital and organizational justice and lower quality of management increased the rate of early retirement. After adjusting for these psychosocial factors, the rate of early retirement was still significantly higher among employees who experienced change of management, but the remaining types of organizational change had no significant effect. Adjusting for organizational changes increased the effect of psychosocial work environment on retirement.

Discussion

The adjusted analyses of organizational change provided in this paper showed that Danish senior public employees who experienced change of management, or merging or relocation of work units had a higher rate of early retirement. Demerging of work unit was not related to early retirement. Adjusted analyses of psychosocial work environment showed that poorer social capital and organizational justice and lower quality of management increased the rate of early retirement. After adjusting for these psychosocial factors, the rate of early retirement

was still significantly higher among employees who experienced change of management, but the remaining types of organizational change had no significant effect. Adjusting for organizational changes increased the effect of psychosocial work environment on retirement.

Other findings

To the best of our knowledge, the association between workplace organizational change and early retirement not granted by disability or poor health has only been systematically examined in one previous epidemiological study: de Wind et al (8) examined determinants of early retirement in a longitudinal study with one-year follow-up of 2317 Dutch employees aged 59–63 years. While financial possibility and spouse expectations were strong determinants, this study did not reveal increased rate of early retirement in relation to organizational change, which 34% of the participants reported. On the contrary, organizational change associated with compulsory redundancies was related to a decreased rate of early retirement (OR 0.75, 95% CI 0.48–1.17). This finding based upon self-reports seems contrary to results obtained in our study, but the type(s) of organizational change(s) was not specified and the study population differed in terms of job types and gender distribution, limiting comparison.

Mechanisms

A study including qualitative interview data on 30 Dutch employees aged 60–64 who retired early found that organizational change was frequently reported as reasons for early retirement (7). Employees in this study highlighted loss of motivation to continue working due to job routines undergoing continuous changes not perceived as necessary. Organizational change has been found to have negative effects on employee outcomes, such as decreased organizational commitment, job insecurity, and job withdrawal in all ages (20, 21). Moreover, senior employees tend to perceive organizational change as more stressful compared to their younger counterparts (16), which may accelerate the decision to retire early.
(22). In addition, a previous study from our research group (2) investigated factors associated with the “risk” of intending to quit the job if economically possible in a cohort of hospital employees of all ages. Suadicani et al (23) found that employees with intention to quit their job rated the quality of management lower than employees with no intention to quit, which is in line with findings of the present study. However, inclination to quit does not necessarily lead to de facto retirement. Social pressures in the workplace are suggested to be a key factor in limiting employees’ decision to exit the labor market (17). Interestingly, demerging of the work unit was not associated with increased risk of early retirement. This could be explained by this type of organizational change being less extensive, since Vahtera et al (24) found that minor organizational changes have fewer adverse health effects than major changes.

Furthermore, organizational changes have been demonstrated to affect the employees’ perceived psychosocial work environment (12). In this study, we found that adjusting for psychosocial work environment scales diminished the effect of organizational changes on early retirement. This indicates that part of this effect is due to perceived changes in the psychosocial work environment.

**Strengths and limitations**

This prospective study employed independent measures of exposure and outcome. Thus we obtained information on organizational change by few specific questions to work-unit managers while information on retirement was retrieved from highly reliable national registers. Selection bias is not an issue since employees were included regardless of their participation in the questionnaire survey and the registers provide complete data. We also consider it a strength that assessment of psychosocial work environment factors such as social capital, organizational justice, and quality of management were based on a work-unit-level approach. Using work-unit means of psychosocial work environment provides aggregated measures that are less affected by individual perceptions, and this can limit reporting bias and is more relevant in identifying risk factors relating to the psychosocial working environment (25, 26). In this particular study, this approach also reduced missingness since non-respondents were assigned the work-unit mean score. Analyses using individual scores on psychosocial work-environment scales showed similar associations, but all estimates were inflated compared to the analyses using work-unit mean scores (results not shown).

Some limitations also need to be acknowledged. First, the variation in the three psychosocial work environment scales was large within work units compared to between units (intra-class correlations 0.17–0.21). Still, the contrast between work units was considerable with an interquartile range spanning some 20–25% and even if disregarding within-unit variation leads to measurement error, risk estimates were not necessarily attenuated (27).

Second, missingness could be a source of bias if non-respondents differed from our study population with respect to work environment or organizational changes as well as the tendency to retire early. We found that the frequency of early retirement did not differ significantly between respondents and non-respondents with respect to organizational changes but that retirement was more frequent with a missing response on all three work-environment scales. If non-respondents would have had a lower score on the scales, this missingness could lead to underestimating the effect of the psychosocial work environment.

Third, ad hoc scales modified from the second version of the Copenhagen Psychosocial Questionnaire (19) were applied to measure the perceived psychosocial work environment, but high alpha-values indicate reliability of the scales.

Fourth, the present study focused on push (or negative) factors related to early retirement, such as poor social capital, organizational injustice, and low quality of management. In contrast to push factors, pull factors are positive considerations increasing the motivation to retire early, such as wish to spend more time with significant others or hobbies (10, 18). The current study would probably have benefitted from data on pull fac-

### Table 4. Association between work-unit mean score on psychosocial work environment scale and early retirement. Adjusted hazard ratio (HR) associated with a 20-point decrease on the scale. [IQR=interquartile range; 95% CI=95% confidence interval.]

| Scale                        | N     | Mean | IQR   | Crude HR 95% CI | Adjusted b HR 95% CI | Adjusted c HR 95% CI |
|------------------------------|-------|------|-------|-----------------|----------------------|----------------------|
| Social capital               | 2912  | 67   | 59–74 | 1.19 1.03–1.37  | 1.22 1.05–1.41       | 1.30 1.09–1.55       |
| Organizational justice       | 2893  | 62   | 53–72 | 1.12 1.00–1.27  | 1.18 1.04–1.32       | 1.27 1.10–1.47       |
| Quality of management        | 2837  | 64   | 54–75 | 1.05 0.95–1.16  | 1.14 1.02–1.25       | 1.21 1.07–1.38       |

* Adjusted for age.
* Adjusted for age, gender, medical diagnosis, civil status, occupation, personal income, and household income.
* Adjusted for all variables above + organizational change indicators.
tors and financial possibilities facilitating early exit from the labor market. Such factors are strong predictors for retirement (8, 9), but since there is no obvious reason to believe that these variables are correlated with the explanatory variables of interest, organizational changes or psychosocial work environment, we argue that this did not cause bias.

Fifth, the study population were predominantly female. This is characteristic of healthcare employees and generalizations of the results to other parts of the public sector should be made with caution.

In conclusion, the findings of this study indicate that organizational changes in the public sector have potentially strong impact on early retirement among employees older than 60 years of age, independent of disability or poor health, and that efforts to improve the psychosocial work environment during restructuring is important.

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