Organisational downsizing and increased use of psychotropic drugs among employees who remain in employment

Mika Kivimäki, Teija Honkonen, Kristian Wahlbeck, Marko Elovinio, Jaana Pentti, Timo Klaucka, Marianna Virtanen, Jussi Vahtera

Objective: Organisational downsizing is common in modern work life, but its effect on employees’ mental health is not known. The authors examined whether working in downsizing organisations predicts increased use of psychotropic drugs among employees who remain in employment.

Design, setting and participants: Prospective cohort study of municipal employees in Finland. 4783 employees worked in downsized units but kept their jobs after downsizing in 1993, 4271 employees lost their jobs during the downsizing, and 17 599 employees did not experience downsizing. The outcome was psychiatric drug prescriptions (antidepressants, anxiolytics and hypnotics) during 1994–2000 extracted from nationwide registers and linked to the data by means of each participant’s personal identification number.

Main results: After adjustment for predownsizing characteristics, employees who were exposed to downsizing but kept their jobs were at a higher risk of being prescribed psychotropic drugs (rate ratio 1.49, 95% CI 1.10 to 2.02 in men and 1.12, 95% CI 1.00 to 1.27 in women) than those not exposed to downsizing. The association of downsizing was strongest with hypnotics among the men and with anxiolytics among the women. An increased rate of psychotropic prescriptions after downsizing was also seen in male workers who lost their job (rate ratio 1.64, 95% CI 1.19 to 2.25).

Conclusions: The association between organisational downsizing and increased use of psychotropic drugs suggests that this managerial strategy may pose mental health risks among employees.
Assessment of downsizing

The data on downsizing were obtained from the employers’ records covering all periods of full-time employment, including the date of commencement and, where appropriate, the termination of work contracts, and Statistic Finland occupational title.20 Personnel reduction in a group of employees was defined as previously.11 12 15–19

We calculated the personnel reduction for all of the occupational groups in each city by comparing the total number of person-years worked in the group in 1993 with the corresponding person-years in 1991. Thus, the percentage of personnel reduction was obtained for 272 employee groups and this percentage was linked to all of the members of each group to obtain a measure of downsizing. In keeping with previous analyses we defined a downsizing organisation as one that reduced its workforce by 18% or more.11 12 15–19

Assessment of drug prescriptions

Data on psychotropic drug prescriptions were collected from the National Prescription Register, managed by the Social Insurance Institution of Finland.21 The national sickness insurance scheme covers the entire population, regardless of age or occupational status, and provides reimbursement for virtually all filled prescriptions. The prescription register of the Social Insurance Institution is comprised of outpatient prescription data based on the World Health Organization Anatomical Therapeutic Chemical (ATC) classification code.22 In Finland, all prescriptions are written by a physician and each prescription can cover antidepressant use for a maximum of three months. The Social Insurance Institution obtains these data from all pharmacies in Finland as part of the national drug reimbursement scheme.23

The number of prescriptions for psychotropic drugs, such as antidepressants (ATC code N06A), anxiolytics (NO5B) and hypnotics (NO5C), and for all other prescriptions were calculated for each participant between 1 January 1994 and 31 December 2000. There were no registered data on pre-downsizing prescriptions available, because the National Prescription Register for these data was not set up until 1994.

Assessment of pre-downsizing characteristics

The workers’ sex, age and occupational status before downsizing (manual v non-manual) were derived from the employers’ records in 1991. Education (primary, secondary or tertiary) was obtained from the Statistics Finland registers.

Statistical analyses

Analyses were performed separately for men and women, because psychotropic drug use and determinants of mental health vary between sexes.5 16–24 Employees were categorised into three groups: (1) employees in downsized group: if the reductions in personnel were greater than 18%; (2) employees who lost or left their jobs during downsizing; and (3) employees in non-downsized group (the reference group).

We analysed between-group differences in the pre-downsizing characteristics with $\chi^2$ test for sex and employer and with analysis of variance for age. The frequency of prescriptions demonstrates a skewed distribution—low values being the most frequent and high values being rarely observed (that is, a negative binomial distribution). Thus a negative binomial regression analysis was performed to assess associations between post-downsizing status and the rates of psychotropic and other drug prescriptions. We calculated the rate ratios for
the downsized group and the group who lost or left their job during the downsizing using the non-downsized group for comparison, while controlling for the effect of the pre-downsizing characteristics by including them in the model as independent variables.

To examine whether the effects of downsizing on psychotropic prescriptions were different for non-manual and manual employees, we carried out a stratified analysis by occupational status. All the analyses were performed with the use of SAS software, version 8.2 (SAS Institute, Cary, North Carolina, USA).

RESULTS

Figure 1 presents characteristics of the participants by post-downsizing status. Participants who were employed in groups not exposed to downsizing were older, more often male and had higher educational attainment than those who worked in the downsized groups or who left or lost their jobs during the downsizing (all p < 0.001). Occupational status in downsized groups was lower than that in other groups (p < 0.001).

Downsizing and subsequent psychotropic drug prescriptions

Altogether 806 992 prescriptions (145 112 for men and 611 880 for women) were recorded during the follow-up for the participants. As shown in Table 1, women were more often prescribed psychotropic drugs, especially antidepressants, and other drugs than men (all p < 0.004).

Table 2 presents the association between post-downsizing characteristics by including them in the model as independent variables. A stratified analysis by specific psychotropic drug prescriptions showed that the associations of downsizing were strongest with hypnotics (rate ratio 1.81, 95% CI 1.21 to 2.70, p = 0.004) among the men and with anxiolytics (1.30, 95% CI 1.12 to 1.52, p = 0.001) among the women (data not shown). Those men who lost or left their job during downsizing had also a 1.2-fold increased rate of other prescriptions.

| Table 1 Proportion of employees with psychotropic drug prescriptions and other prescription over the 7-year study period and rate of drug prescriptions by sex |
|----------------------------------|-----------------|-----------------|-----------------|
|                                  | Men (n = 6620)  | Women (n = 20 033) |
| No of cases                      | Rate per 1000 person-years | No of cases | Rate per 1000 person-years |
| Psychotropic prescriptions       |                 |                 |
| Antidepressants                  | 51.4            | 59.1            |
| Anxiolytics                      | 18.9            | 25.8            |
| Hypnotics                        | 19.2            | 19.3            |
| Other prescriptions              | 265.9           | 379.5           |

Socioeconomic differences

Table 3 presents the association between post-downsizing status and subsequent psychotropic drug prescriptions by occupational status. In the men, downsizing was associated with increased prescription rate in both non-manual and manual groups. In the women, this was the case only for non-manual group and the effect was substantially smaller.

DISCUSSION

This quasi-experimental outcome study of 26 653 city employees suggests that downsizing is a mental health risk, not only for employees who lose their jobs, but also for those who remain in employment. Men who kept their jobs after downsizing had a significantly higher rate of psychotropic prescriptions than men who worked in non-downsized groups when controlled for pre-downsizing characteristics. For women, organisational downsizing was associated with slightly increased psychotropic prescription rate (anxiolytics in particular). The highest rate of psychotropic prescriptions after downsizing was seen in male manual workers who lost their jobs.

This study has several important methodological advantages. The putative stressor, downsizing, was uniform for all of the participants in the quasi-experimental groups, and clearly separable from the putative consequences of the stressor. Data about prescriptions came from comprehensive national registers, and information about downsizing was obtained from

| Table 2 Negative binomial regression models for rate of psychotropic drug prescriptions and other prescriptions by post-downsizing status |
|----------------------------------|-----------------|-----------------|-----------------|
| Post-downsizing status           | Participants (n) | Psychotropic drug | Other prescriptions |
|                                  |                 | Rate ratio (95% CI) | p Value | Rate ratio (95% CI) | p Value |
| Men                              |                 |                 |          |                 |          |
| Employed in non-downsized group  | 4961            | 1.00             |           | 1.00             |          |
| Employed in downsized group      | 932             | 1.49 (1.10-2.02) | 0.009    | 1.03 (0.94-1.12) | 0.54    |
| Lost or left their job during downsizing | 725          | 1.64 (1.19-2.25) | 0.002    | 1.16 (1.06-1.27) | 0.002    |
| Women                            |                 |                 |          |                 |          |
| Employed in non-downsized group  | 12638           | 1.00             |           | 1.00             |          |
| Employed in downsized group      | 3851            | 1.12 (1.00-1.27) | 0.05     | 0.99 (0.95-1.02) | 0.50    |
| Lost or left their job during downsizing | 3542          | 1.05 (0.93-1.19) | 0.42     | 0.97 (0.94-1.01) | 0.11    |

Rate ratios and 95% confidence intervals (CI) are adjusted for age, education, occupational status and local government.
employers’ files. Therefore, the study did not rely on self-reported data from employees and was not subject to common method variance bias. Previous studies of work stress and mental health have exclusively used self-reported data on workplace exposures.4–10

**Downsizing as a predictor of psychiatric disorders requiring treatment**

We studied downsizing during a major national recession, when the unemployment rate nearly tripled during a two-year period and reached the rather substantial rate of 17%.25 Cities and towns were forced to downsize personnel to save costs, but the legislation did not allow parallel cuts in the services provided. In the downsized groups, the cuts resulted in greater levels of job demands and job insecurity with a concomitant decrease in job control,11 that is, changes that characterise increased work stress according to the job strain model and the effort-reward imbalance model.26–27 Indeed, organisational downsizing has been shown to be a strong predictor of stress-related physical health outcomes, including cardiovascular mortality.11–13

In men, downsizing was associated with increased psychotropic prescription rate among both non-manual and manual groups. In women, this was the case only for non-manual group and the effect was substantially smaller. Findings from previous studies also suggest that the effects of work stressors on mental health may vary by gender.28–31 For example, the association between job insecurity (a correlate of downsizing) and depressive symptoms was stronger for men than women in a representative sample of the Danish workforce.32 A Swedish study showed that a combination of stressful conditions at work and at home predicted perceived symptoms in women, whereas for men symptoms were more strongly determined by work stress alone.29

These findings underline the importance of conducting analyses stratified by sex and socioeconomic position when studying the effects of downsizing on mental health. Further research is needed to determine whether the observed differences may in part be explained by different changes in work after downsizing between men and women and socioeconomic groups, or whether more general differences in the meaning of work—and thus differences in the vulnerability to work changes—might underlie these results.

**Limitations**

Our results should be interpreted in light of some limitations. The selection of variables included in the analysis was largely dependent on the availability of data in source registers, making some variables of interest absent in this study. A drawback was that prescription records were available only for the post-downsizing period from 1994 onwards. In order to analyse the immediate consequences of the changes at work, the follow-up time should have begun from the first experiences of downsizing. It is probable that we lost many cases in downsized groups in 1991–3 (before starting follow-up) and thus the effect of downsizing may be underestimated in our findings.

As we had no data on prescriptions at the pre-downsizing phase, it is also important to consider selective retention, an issue that may lead to an overestimation of the effect of downsizing. Selective retention (that is, employees with poor mental health remaining in downsized groups) may explain the observed association between downsizing and an increased risk of being prescribed psychotropic drugs if those who lost their jobs had significantly less psychotropic drugs prescriptions than those who remained. Our findings on men suggest that this was not the case: those who lost their jobs during downsizing had a higher risk of being prescribed psychotropic drugs than employees with no downsizing.

For observational studies without randomisation, the possibility of confounding remains. In this study, socioeconomic position is a potential confounding factor for the observed association between downsizing and psychotropic prescriptions. However, there are two reasons why we think this is unlikely. First, controlling for the effects of education and occupational status (two major socioeconomic indicators) had little effect on this association among the men. Second, a stratified analysis showed similar effects of downsizing on psychotropic prescriptions for both non-manual and manual men. If confounded, the association between downsizing and prescriptions would differ in terms of direction or magnitude between levels of socioeconomic position.

Finally, corresponding to Finnish municipal workers in general,26 our cohort was 74% female and racially homogeneous (white employees). Future research with more diverse samples is needed to evaluate the generalisability of our findings, and additional data on the employment of those who are downsized would complement such an analysis.

**Conclusions**

In summary, as demonstrated in this quasi-experimental study based on register sources and other studies using self-reports,7–10 measurements within working populations and those sensitive to minor psychiatric disorders reveal that work may include significant risk factors for mental health. There may be several reasons why stressful conditions at work have received little attention as risk factors in previous psychiatric research. In clinical populations including both the employed and the unemployed, the protective aspects of work may mask any effects of work-related risks. Moreover, survival bias may prevent effective detection of the adverse effects of work, as major psychiatric disorders are a common cause of work disability and a potential selective factor for unemployment (which further increases the risk of psychiatric disorders).

**Table 3** Negative binomial regression models for rate of psychotropic drug prescriptions by post-downsizing status and occupational status before downsizing

<table>
<thead>
<tr>
<th></th>
<th>Non-manual</th>
<th></th>
<th>Manual</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Participants [n]</td>
<td>Rate ratio (95% CI)</td>
<td>p Value</td>
<td>Participants [n]</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed in non-downsized group</td>
<td>3285</td>
<td>1.00</td>
<td></td>
<td>1676</td>
</tr>
<tr>
<td>Employed in downsized group</td>
<td>254</td>
<td>1.87 (1.11–3.12)</td>
<td>0.02</td>
<td>678</td>
</tr>
<tr>
<td>Lost or left their job during downsizing</td>
<td>467</td>
<td>1.40 (0.94–2.08)</td>
<td>0.09</td>
<td>258</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed in non-downsized group</td>
<td>10545</td>
<td>1.00</td>
<td></td>
<td>2093</td>
</tr>
<tr>
<td>Employed in downsized group</td>
<td>2985</td>
<td>1.20 (1.04–1.37)</td>
<td>0.01</td>
<td>866</td>
</tr>
<tr>
<td>Lost or left their job during downsizing</td>
<td>2929</td>
<td>1.15 (1.01–1.32)</td>
<td>0.04</td>
<td>613</td>
</tr>
</tbody>
</table>

Rate ratios and 95% confidence intervals (CI) are adjusted for age, education and local government.
What is already known

- Organisational downsizing is common in modern work life.
- Organisational downsizing has been found to increase workload and reduce job security and job control for those who remain in employment.
- The effect of downsizing on mental health has remained unclear.

What this paper adds

- Employees who remained in work were at increased risk of being prescribed psychotropic drugs after downsizing.
- In men, downsizing was associated with increased psychotropic prescription rate among both non-manual and manual groups.
- In women, this was the case only for non-manual groups and the effect was substantially smaller.

Policy implications

- Policy makers, employers, and occupational health professionals should recognize that organizational downsizing may pose mental health risks among employees.
- The observed excess risk of being prescribed psychotropic drugs after downsizing among employees indicates a burden, not only on the individual, but also on society.

The observed 1.1–1.9-fold excess risk of being prescribed psychotropic drugs after downsizing among the men and women indicate a great burden, not only on the individual, but also on society. Our findings imply that work conditions should increasingly be recognized in large-scale preventive strategies for psychiatric disorders.

ACKNOWLEDGEMENTS

This study was supported by the Academy of Finland (projects 117604 and 105195), the Finnish Work Environment Fund (projects 101190 and 103432), the Finnish Local Government Pensions Institution and the participating towns. We thank Professor David Gunnell for his insightful comments to an earlier version of this paper.

Authors’ affiliations

T Honkonen, J Penti, M Virtanen, J Vahtera, Finnish Institute of Occupational Health, Helsinki, Finland
M Kivimäki, Department of Epidemiology and Public Health, University College London, London, UK
K Wahlbeck, M Elavainio, National Research and Development Centre for Health and Welfare, Helsinki, Finland
T Klaucka, Social Insurance Institution, Helsinki, Finland

REFERENCES