Temporary Employment and Risk of Overall and Cause-specific Mortality

Mika Kivimäki1,2, Jussi Vahtera2, Marianna Virtanen2, Marko Elovinio1, Jaana Pentti2, and Jane E. Ferrie3

1 Department of Psychology, Division of Applied Psychology, University of Helsinki, Helsinki, Finland.
2 Finnish Institute of Occupational Health, Helsinki, Finland.
3 Department of Epidemiology and Public Health, University College London Medical School, London, United Kingdom.

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The number of nonpermanent employees is rising, but mortality in this group has received little attention. The authors examined the associations between temporary employment and all-cause and cause-specific mortality. Longitudinal data from 10 towns in Finland related to 26,592 men and 65,759 women, of whom 1,332 died between 1990 and 2001. Cox proportional hazards models adjusted for age, occupational status, salary, and change in occupational title showed that overall mortality was 1.2–1.6 times higher among male and female temporary employees compared with permanent employees. Temporary employment was associated with increased deaths from alcohol-related causes (hazard ratio (HR) = 2.0, 95% confidence interval (CI): 1.4, 2.9 for men; HR = 1.7, 95% CI: 1.1, 2.5 for women) and, for men, smoking-related cancer (HR = 2.8, 95% CI: 1.3, 6.0). Corresponding risks were greater for the unemployed. Moving from temporary to permanent employment was associated with a lower risk of death than remaining continuously in permanent employment (HR = 0.7, 95% CI: 0.5, 0.9 for men and women combined). These findings suggest that the conventional research practice of treating the employed as a single group may attenuate the associations between employment status and mortality.

alcohol drinking; employment; longitudinal studies; mortality; occupational groups; smoking; socioeconomic factors

Abbreviations: ICD-9, International Classification of Diseases, Ninth Revision; ICD-10, International Classification of Diseases, Tenth Revision.

Studies of employment status and mortality have been based on a dichotomous distinction between employed and unemployed populations. Findings show increased mortality for the unemployed in part resulting from premature deaths from external causes (including suicide) and cardiovascular disease (1–5).

During the past two decades, a trend toward more flexible labor markets has characterized changes in the private and public sectors of developed countries (6–8). In contemporary organizations, a common structure of staffing comprises a core of permanent employees and a fluctuating number of temporary employees to cope with peaks and troughs in production and services. In the European Union and the United States, the number of temporary employees is rising and currently exceeds that of the unemployed (6, 9, 10).

New types of employment are a potentially crucial public health topic (8, 10, 11). To extend understanding of this issue, we examined all-cause and cause-specific mortality in temporary employees compared with that among permanent employees and the unemployed.

MATERIALS AND METHODS

Study population

The present study was part of the ongoing 10-Town Study and included 85,271 (22,853 men and 62,418 women) municipal employees and 7,080 (3,739 men, 3,341 women) long-term unemployed aged 18–63 years. The employed constituted the total full-time staff who had worked more
than 6 months between 1990 and 2000 in the service of 10 Finnish towns (Tampere, Espoo, Turku, Vantaa, Oulu, Raisio, Naantali, Valkeakoski, Nokia, and Virrat). Their job categories ranged from city mayor, teacher, and physician to kitchen assistant, cleaner, and construction worker. The unemployed were those who obtained a short government-supported subsidized work contract (6–10 months) in the service of the towns during the study period. Deaths among participants were followed until December 31, 2001. Approval from the ethics committee of the Finnish Institute of Occupational Health was obtained for the study.

Employment status

For every period of employment for each participant, we obtained type of employment, date of commencement, and, where appropriate, termination of work contract from the employers’ records from January 1, 1990, to December 31, 2000. Each participant was exclusively allocated into one of the following four categories: 1) permanent employees (permanent job contract between 1990 and 2000; employees who changed from permanent employment to fixed-term jobs were also regarded as permanent employees because, in municipalities, these people typically retain permanent tenure while working in fixed-term jobs); 2) employees who moved from a temporary to a permanent job during this period; 3) temporarily employed workers (fixed-term contract or substitute, but not permanent employment); and 4) long-term unemployed persons who obtained the 6–10-month subsidized work contracts offered by municipalities. The funding of subsidized work contracts for municipalities is part of the government’s program to support and enhance work ability among long-term (>1 year) unemployed men and women in Finland.

During follow-up, the mean length of job contracts for permanent employees was 7.2 years (7.1 for men, 7.2 for women) per person. Corresponding figures for temporary-to-permanent employees and temporary employees were 6.2 years (6.3 for men, 6.2 for women) and 2.4 (2.3 for men, 2.4 for women) per person, respectively.

Mortality

We used participants’ personal identification numbers (a unique number assigned to each Finnish citizen) to collect mortality data from the national mortality register kept by Statistics Finland. This database provides virtually complete population mortality data (12). The date and cause of death for all participants who died between January 1, 1990, and December 31, 2001, were obtained. We analyzed all-cause mortality as well as deaths from three major causes: 1) cardiovascular disease (International Classification of Diseases, Ninth Revision (ICD-9) codes 390–459; International Classification of Diseases, Tenth Revision (ICD-10) codes I00–I99); 2) cancer (ICD-9 codes 140–208; ICD-10 codes C00–C97); and 3) external causes (ICD-9 codes 800–999; ICD-10 codes S00–Y91). In addition, we examined deaths from smoking-related cancer (ICD-9 codes 140, 141, 143–150, 157, 160–163, 188, 189; ICD-10 codes C00–C06, C09–C15, C25, C30–C34, C38, C64–C68) (13) and alcohol-related causes (codes for external causes and ICD-9 codes 141, 143–146, 148–150, 155, 161, 291, 303, 571, 800–998; ICD-10 codes C01–C06, C09, C10, C12–C15, C22, C32, F10, K70) (14).

Other variables

Other information drawn from employers’ registers included the participant’s personal identification number, sex, age, and occupational title both at entry into the study and at the end of follow-up, expressed as five-digit Statistics Finland codes. Occupational titles were classified as manual or nonmanual. Average monthly salary figures for men and women by occupational title were derived from Statistics Finland and were transformed logarithmically because the data were skewed. Change in occupational title, which involved a change in salary, was described as the difference between the level of salary at the end of follow-up and entry into the study.

Statistical analysis

To estimate the relative risk of death, we calculated the hazard ratios and 95 percent confidence intervals by conducting Cox proportional hazards analyses for the unemployed, temporary employees, and those who had transferred from temporary to permanent employment; permanent employees were considered the reference group. Separate models for men and women were stratified by age at death. Hazard ratios were adjusted for age in 10-year categories, occupational status and salary at the end of follow-up (the latter treated as a continuous variable), and change in occupational title. To examine whether the relation between employment type and mortality differed between men and women and between other employee groups, we fitted the corresponding interaction terms and assessed these terms for statistical significance. The analyses were performed by using the PHREG procedure in the SAS 8.2 software program (Statistical Analysis System; SAS Institute, Inc., Cary, North Carolina).

RESULTS

Sample characteristics of the study population are presented in table 1. The 92,351 participants accrued 710,894 person-years of follow-up (mean follow-up, 7.7 years). For men and women, respectively, 22 percent and 29 percent worked exclusively in temporary jobs, 58 percent and 54 percent worked exclusively in permanent jobs, and 14 percent and 5 percent were unemployed between 1990 and 2000. Seven percent of men and 12 percent of women moved from temporary to permanent employment. Temporary employment was more common in nonmanual (28 percent of all participants) than in manual (19 percent) occupations. The reverse was true for the unemployed (5 percent nonmanual, 14 percent manual).

During the follow-up period, we identified 1,332 deaths. The most common cause of death was cancer (38 percent of all deaths, 165 cases in men and 335 in women), followed by cardiovascular disease (23 percent, 186 cases in men and 114
in women) and external causes (23 percent, 191 cases in men and 120 in women).

Table 2 shows adjusted overall and cause-specific mortality figures by employment status. For men and women, temporary employment was associated with an excess risk of mortality. Employees who changed from temporary to permanent jobs had a significantly lower risk of death than permanent employees did (hazard ratio (HR) = 0.70, 95 percent confidence interval (CI): 0.52, 0.94). This finding achieved statistical significance only for women, but no interaction with sex was observed ($p$ for interaction = 0.613). Lowered mortality in temporary-to-permanent employees was not dependent on the proportion of the study period spent in temporary or permanent employment ($p$ for interaction = 0.544). Among men and women, the unemployed had a significantly higher risk of death than employees with a permanent job contract.

## Table 2. Associations of employment status with overall mortality and death from specific causes, expressed as hazard ratios and their 95% confidence intervals and adjusted for age in 10-year categories, occupational status, and salary, 10-Town Study, Finland, 1990–2001

<table>
<thead>
<tr>
<th>Sex and employment status</th>
<th>Overall (n = 1,332 deaths)</th>
<th>Cardiovascular disease (n = 300 deaths)</th>
<th>Cancer (n = 500 deaths)</th>
<th>External causes (n = 311 deaths)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR*</td>
<td>95% CI*</td>
<td>HR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>From temporary to permanent</td>
<td>0.87</td>
<td>0.53, 1.44</td>
<td>1.10</td>
<td>0.45, 2.72</td>
</tr>
<tr>
<td>Temporary</td>
<td>1.61</td>
<td>1.25, 2.09</td>
<td>0.99</td>
<td>0.55, 1.80</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2.81</td>
<td>2.18, 3.64</td>
<td>2.36</td>
<td>1.43, 3.89</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>From temporary to permanent</td>
<td>0.63</td>
<td>0.44, 0.89</td>
<td>0.35</td>
<td>0.11, 1.11</td>
</tr>
<tr>
<td>Temporary</td>
<td>1.24</td>
<td>1.01, 1.54</td>
<td>1.42</td>
<td>0.86, 2.35</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2.91</td>
<td>2.16, 3.91</td>
<td>4.23</td>
<td>2.29, 7.81</td>
</tr>
</tbody>
</table>

* HR, hazard ratio; CI, confidence interval.
deaths. The unemployed were at the highest risk of death from cardiovascular diseases, cancer (men only), and external causes.

Table 3 shows smoking-related cancer mortality (11 percent of all deaths) and mortality due to alcohol-related causes (31 percent) by employment status. An excess risk of death from these causes was seen in temporarily employed and unemployed men. For temporarily employed and unemployed women, this finding was true for alcohol-related mortality. The hazard ratios for these causes of death were greater than for any other causes under study (refer to table 2).

DISCUSSION

We found that temporary employment was associated with higher mortality than permanent employment but with lower mortality than unemployment. The lowest risk of death was observed for those who moved from a temporary job to a permanent job. These findings were adjusted for age, salary, occupational status, and change in occupational title, indicating that socioeconomic confounding is unlikely to explain them. The specific strengths of the present study include a large sample size covering all municipal occupations, inclusion of the group of unemployed people, a long follow-up period, and reliable employment and mortality data from national registers.

Increased mortality among temporary employees

Robust mortality differentials between temporary and permanent employees suggest that the conventional research practice of treating the employed as a single group may attenuate the associations between employment status and mortality. An adverse behavioral profile is one of the multiple factors that could explain the increased mortality among those in temporary employment. According to our findings on cause-specific mortality, deaths from alcohol-related causes were almost twice as common in temporary employees as in permanent employees, and mortality due to smoking-related cancer was nearly three times higher in temporarily employed men than in their male colleagues with permanent contracts. The association between temporary employment and mortality was weaker for other specific causes of death.

Previous studies suggest that temporary employment is a positive choice for only a minority and that the proportion of employees in involuntary temporary employment has increased (15). On one hand, job insecurity and sustained stress have been associated with an increase in health-risk behaviors (16, 17); on the other, temporary employees with unhealthy behaviors, such as a sedentary lifestyle, have been shown to be less likely to achieve a permanent contract (18). Hence, it is possible that remaining in temporary employment involves a cycle in which a less healthy lifestyle can be both a result of less satisfactory employment and the reason for being selected to remain in such employment.

Moving from temporary to permanent employment

Many employees transfer to a permanent contract following a temporary contract with the same organization. In this study, one in 10 moved from a temporary job to a permanent job. Compared with permanent employees, such employees had significantly lower mortality. This finding suggests that selection to permanent jobs may partially be related to factors associated with health. Indirect and/or direct health selection from temporary to permanent employment has largely been a neglected public health issue. Prior research on labor-force mobility indicates that health selection is manifest in educational achievement (19), from employment to unemployment (20, 21), from unemployment to reemployment (20, 22), and in occupational mobility (23).

<table>
<thead>
<tr>
<th>Sex and employment status</th>
<th>Smoking-related cancer (n = 153 deaths)</th>
<th>Alcohol-related causes (n = 414 deaths)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR* 95% CI</td>
<td>HR 95% CI</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>From temporary to permanent</td>
<td>1.47 0.36, 6.12</td>
<td>0.61 0.25, 1.50</td>
</tr>
<tr>
<td>Temporary</td>
<td>2.80 1.32, 5.95</td>
<td>1.97 1.36, 2.87</td>
</tr>
<tr>
<td>Unemployed</td>
<td>4.12 1.90, 8.97</td>
<td>3.05 2.04, 4.54</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>From temporary to permanent</td>
<td>0.84 0.30, 2.35</td>
<td>0.80 0.41, 1.54</td>
</tr>
<tr>
<td>Temporary</td>
<td>1.38 0.73, 2.63</td>
<td>1.66 1.11, 2.48</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.53 0.07, 3.86</td>
<td>5.47 3.36, 8.91</td>
</tr>
</tbody>
</table>

* HR, hazard ratio; CI, confidence interval.
but explains only a minimal proportion of health differentials between socioeconomic statuses (24).

Unemployment

In our study population, long-term unemployment compared with permanent employment was associated with two to four times higher all-cause and cardiovascular mortality and three to five times higher alcohol-related mortality in men and women. These figures may be an underestimate of the actual association because our data were limited to those unemployed who achieved a subsidized job contract. These people are likely to be from the most active part of the long-term unemployed population. Prior studies may also underestimate the association between unemployment and mortality because they have collapsed temporary and permanent employees into the same employed population reference group.

Implications for future research

The present study showed an association between employment type and mortality. However, further research is needed to explicate mechanisms underlying this association and to assess the generalizability of our findings.

First, although the observed cause specificity of the excess mortality in temporary workers implies that elevated behavioral risk may be one of the explanatory factors, longitudinal data on smoking, alcohol intake, and other lifestyle factors are needed to confirm this hypothesis. In the same vein, the hypothesized role of direct and indirect health-related selection in the lower mortality of temporary-to-permanent employees needs confirmation: It is not clear to what extent health status is the determining factor for selection into permanent employment or some other factor that is only related to health. For example, physical activity and job satisfaction have been shown to increase the likelihood of obtaining permanent employment (18). It is also possible that temporary work may be the employment of choice for employees who have a high level of domestic responsibility. Finally, the lower rate of mortality among temporary-to-permanent employees must be seen in the context of the wearing off of selection among those who remain continuously in permanent employment (25).

Second, in addition to health-related selection, psychosocial, behavioral, and material benefits of moving from temporary to permanent jobs may explain the lower mortality figures, but only if these benefits exceed those among employees who remain in permanent employment. In the present study, promotion and salary increases were unlikely candidates in this regard, because additional adjustment for them had little effect on hazard ratios. Further research on work- and non-work-related health risks and benefits, as well as individuals’ cumulative exposure to different types of employment, is needed to shed light on mechanisms operating between employment type and mortality.

Third, our cohort comprised predominantly a female population working in the public sector. Further research is needed to examine whether the findings would be underestimates for the private sector, where temporary employment is more precarious and competition for permanent jobs is stiffer, and for other countries with less generous benefit policies than those in Finland.

Conclusions

Nonpermanent jobs have become an integral feature of modern work life (10). This study appears to be the first to link temporary employment with mortality. Our findings show that temporary employment is associated with increased all-cause mortality and deaths from alcohol-related causes and smoking-related cancer. On the other hand, a move from temporary to permanent employment is associated with a lower risk of mortality. Our evidence suggests that labor market research should move away from the traditional dichotomy of employed versus unemployed toward a more stratified analysis including a distinction between workers with permanent employment and those with temporary jobs.

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REFERENCES


