SOCIOECONOMIC INFLUENCES

Temporary employment and health: a review

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Objectives We aimed to review evidence on the relationship between temporary employment and health, and to see whether the association is dependent on outcome measure, instability of employment, and contextual factors.

Method We systematically searched for studies of temporary employment and various health outcomes and critically appraised 27 studies.

Results The review suggests higher psychological morbidity among temporary workers compared with permanent employees. According to some studies, temporary workers also have a higher risk of occupational injuries but their sickness absence is lower. Morbidity may be higher in temporary jobs with high employment instability and in countries with a lower number of temporary workers and unemployed workers.

Conclusions The evidence indicates an association between temporary employment and psychological morbidity. The health risk may depend on instability of temporary employment and the context. Confounding by occupation may have biased some of the studies. Additional research to clarify the role of employment instability, hazard accumulation, and selection is recommended.

Keywords Employment status, health, labour market, morbidity, mortality, socioeconomic factors

Temporary employment arrangements have increased in developed countries during the past 10 years. Temporary employment can be defined as paid employment relations other than those with unlimited duration, including fixed-term and subcontracted jobs, as well as work done on projects, on call and through temporary-help agencies. In 2001, temporary job contracts accounted for 13% of paid employment in Europe and for 7% in North America, for a total of 32 million people in these work arrangements.

The flexible labour market is assumed to follow a core-periphery structure. The core of employees with a relatively secure labour market status is surrounded by spheres and sectors of a ‘buffer work force’ with various kinds of more unstable and insecure work arrangements, carrying higher risks of unemployment and other social disadvantages. There is a growing body of evidence showing that unemployment is associated with increased mortality and morbidity. However, no agreement exists as to whether the health and well-being of the employed population are unevenly distributed along the core-periphery structure. Erosion of income, job insecurity, deficient benefits and on-the-job-training, lack of prospects for promotion, and exposure to hazardous work conditions have been suggested as potential psychosocial and material pathways through which temporary employment can damage health.

However, not all temporary jobs necessarily provide inferior status and high insecurity, and some research has suggested that temporary work benefits workers when it allows them to control their work time, sample a variety of work experience, and use their temporary job as a stepping stone into permanent employment. The health effects of temporary employment may also be dependent on the degree of instability in a temporary job. Furthermore, it has been suggested that the health effect of temporary employment may be outcome-specific and that the work conditions and health of temporary workers may depend on the social and environmental context.

Research on the health consequences of flexible worklife is relatively new. Despite rapidly growing activity in the field...
during the past few years, systematic reviews with quality filters have been lacking. A review published in 2001\textsuperscript{21} dealt with occupational health in precarious employment and work reorganization, for example restructuring, downsizing, and temporary jobs. Our systematic review updates existing evidence on the relationship between temporary employment and health and focuses on peer-reviewed reports published in international journals. We also examined whether the relationship is dependent on (i) health outcome, (ii) the degree of instability in temporary employment, and (iii) context, as indicated by the national proportion of temporary employees, unemployment rate, and the degree of active spending on labour market programmes.

Methods

Study selection

We identified relevant reports of temporary employment and health by searching PubMed (from 1966 to October 2003), PsycINFO (from 1967 to October 2003) and CSA Sociological Abstracts (from 1963 to October 2003). The keyword search terms were ‘temporary’, ‘fixed-term’, ‘atypical’, ‘non-permanent’, ‘non-standard’, ‘flexible’, ‘contingent’, ‘employment’, ‘work’, ‘job’, ‘health’, ‘morbidity’, and ‘mortality’. We complemented this search by manually searching the bibliographies of retrieved articles, previous reviews,\textsuperscript{21} and books.\textsuperscript{22–25} We continued the process of cross-referencing until no new references were identified.

We included only empirical, peer-reviewed studies published in international journals (published in English, French, Spanish, or Italian), used statistical methods and only those that had a reference group of permanent employees. We excluded studies that only focused on part-time jobs although part-time jobs have been considered a form of ‘precarious employment’. The rationale for excluding of part-time work from this review was the problematic overlapping of part-time and permanent employment.\textsuperscript{20} We also excluded the studies limited to job insecurity and health and those exclusively concerning health behaviour, work conditions, or attitudes (e.g. workload and job satisfaction).

Data synthesis

For the summary statistics we made separate analyses for different health outcomes as follows: (i) psychological health status, (ii) physical and global health status (including mortality), (iii) musculoskeletal disorders, (iv) occupational injuries, and (v) sickness absence. We used the odds ratios and their 95% confidence intervals (CIs) as indicators of effect size because the vast majority of the studies reported odds ratios. The continuous outcomes were converted to odds ratios according to the formula presented by Chinn.\textsuperscript{26} The studies which did not report any figure of dispersion were excluded from the meta-analyses.\textsuperscript{27–34}

In order to study the association between contextual factors and morbidity we calculated a single combined summary statistic from all above listed outcomes. However, only one outcome was used from a single study population. In a combined analysis, we preferred doctor-diagnosed diseases to other self-reported health indicators and sickness absence records,\textsuperscript{19,34–39} global health measures to psychological measures,\textsuperscript{40} and psychological measures to measures of musculoskeletal disorders and pain.\textsuperscript{41,42} Mortality study with a 12-year follow-up was treated as an individual study.\textsuperscript{33} The studies reporting results for men and women\textsuperscript{19,35,43} and for different subgroups of temporary employees were considered as individual studies.\textsuperscript{19,40,42,44–46} For the meta-analyses we used random effects model in Stata 8.0 software.

To examine whether the association between temporary employment and morbidity was related to instability of employment, we classified the type of temporary employment into three classes according to the instability of temporary employment.\textsuperscript{4,19} Low instability refers to fixed-term job contract directly with the employer;\textsuperscript{19,37,42–44,46,47} intermediate instability refers to temporary group that includes/ may include several types of temporary contracts;\textsuperscript{40,42,45,46,48,49} high instability refers to temporary group specified as temporary agency, on call, subcontract or seasonal workers.\textsuperscript{19,40,42,44,45,50,51}

To assess whether the results were context-specific, we acquired data from country-specific statistics\textsuperscript{5–7} containing the national proportion of temporary employment and unemployment rates during the data collection of the studies. We also calculated an index for the activity of the labour market policy as, Active spending on labour market programmes per Gross Domestic Product\textsuperscript{52} divided by the local unemployment rate. Studies with unavailable records on temporary employment\textsuperscript{49,51} or labour market spending\textsuperscript{51} within the country in question and one study concerning jointly analysed data from all 15 countries in the European Union\textsuperscript{44} were excluded from these specific examinations. Meta-regression analyses with Stata 8.0 software were used to examine whether the instability of employment, the contextual factors, the proportion of women in the study, or the sample type (population-based vs industry-specific sample) were the sources of heterogeneity between the studies.

Results

We identified 27\textsuperscript{19,27–51,53} studies on the association between temporary employment and health. Of them, 14 were prospective studies, 2 were retrospective, and 11 were cross-sectional. The methods and results of these studies are summarized in Tables 1–3. The studies are grouped by outcome measures; health status in Table 1 (divided into psychological, physical/global health, and musculoskeletal disorders), occupational injuries and mortality in Table 2, and sickness absence in Table 3.

Results by health outcomes

Compared with permanent employees, the combined risk estimate indicated higher psychological distress among temporary employees, odds ratio 1.25 (95% CI 1.14–1.38), (Figure 1). However, the test showed a high degree of heterogeneity (\(Q = 32.91; P = 0.012\)). The corresponding odds ratio for poor physical and global health status was 1.08 (95% CI 0.94–1.25; \(Q\) for heterogeneity = 50.29, \(P\)-value <0.001); for musculoskeletal disorders 1.24 (95% CI 0.69–2.22; \(Q\) for heterogeneity = 481.19, \(P\)-value <0.001); and for sickness absence 0.77 (95% CI 0.65–0.91; \(Q\) for heterogeneity = 59.64, \(P\)-value <0.001). With regard to occupational injuries, the number of studies with available data for effect size was not sufficient for the meta-analysis. However, 7 of 13 separate
Table 1: Studies reporting an association between temporary employment and health status

<table>
<thead>
<tr>
<th>Author(s) and year</th>
<th>Sample, location</th>
<th>Study design (beginning Year)</th>
<th>No.</th>
<th>Age, sex</th>
<th>Potential confounders considered</th>
<th>Outcome measure(s)</th>
<th>Type of temporary employment</th>
<th>Morbidity</th>
<th>National unemployment rate/ prevaience of temporary employees (%)</th>
<th>Labour market policy activity index</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-reported psychological health status</strong></td>
<td></td>
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<tr>
<td>Aronsson and Göransson 199941</td>
<td>Stratified subsample from labour market survey, Sweden</td>
<td>Cross-sectional (1995)</td>
<td>1564</td>
<td>22% &lt; 30 years, 78% &gt; 30 years</td>
<td>Age, sex, SES</td>
<td>Fatigue/slight depression</td>
<td>Temporary</td>
<td>Null</td>
<td>8.8/14.6d</td>
<td>2.97</td>
</tr>
<tr>
<td>Martens et al. 199940</td>
<td>Patient sample from general practitioners, Belgium</td>
<td>Cross-sectional (1994)</td>
<td>160</td>
<td>Mean 34 years 35% women</td>
<td>Age, SES, working conditions, lifestyle</td>
<td>Psychological performance, Quality of sleep</td>
<td>Temporary On call Temporary On call</td>
<td>Pos</td>
<td>Null Null</td>
<td>9.8/5.1 1.24</td>
</tr>
<tr>
<td>Lasfargues et al. 199941</td>
<td>Patient sample, France</td>
<td>Cross-sectional (1996)</td>
<td>1452</td>
<td>Mean 30 years 47% women</td>
<td>Sex (+ some others, but not specified)</td>
<td>Psychological well-being</td>
<td>Temporary men Temporary women</td>
<td>Null</td>
<td>11.9/14.4 1.30</td>
<td></td>
</tr>
<tr>
<td>Benavides et al. 200044</td>
<td>Employed persons from a sample of the active population, 15 EU countries</td>
<td>Cross-sectional (1996)</td>
<td>11 782</td>
<td>≥15 years % women not reported</td>
<td>Age, sex</td>
<td>Fatigue</td>
<td>Fixed-term</td>
<td>Pos</td>
<td>10.9/11.7d</td>
<td>1.07</td>
</tr>
<tr>
<td>Moilanen 200045</td>
<td>Hotel and restaurant personnel, Finland</td>
<td>Cross-sectional (1998)</td>
<td>356</td>
<td>Age not reported 86% women</td>
<td>Age, SES</td>
<td>Exhaustion</td>
<td>Temporary</td>
<td>Neg</td>
<td>11.4/17.6 1.40</td>
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</tr>
<tr>
<td>Aronsson et al. 200242</td>
<td>Stratified subsample from labour market survey, Sweden</td>
<td>Cross-sectional (1997)</td>
<td>2767</td>
<td>Mean 45 years 55% women</td>
<td>Age, sex, SES, work hours</td>
<td>Discomfort when going to work</td>
<td>Substitutes On call Seasonal Project Probationary</td>
<td>Pos</td>
<td>Null Null Null Null</td>
<td>9.9/14.6 1.97</td>
</tr>
<tr>
<td>Virtanen et al. 200245</td>
<td>Municipal employees, Finland</td>
<td>Cross-sectional (1997)</td>
<td>8175</td>
<td>Mean 45 years (perm.), 36 years (non-perm.) 76% women (perm.), 80% women (non-perm.)</td>
<td>Age, sex, SES, marital status</td>
<td>Psychological distress</td>
<td>Fixed-term women Fixed-term men</td>
<td>Pos</td>
<td>12.6/18.3 1.40</td>
<td></td>
</tr>
<tr>
<td>Virtanen et al. 200346</td>
<td>Hospital employees, Finland</td>
<td>Prospective cohort, 2-year follow-up (1998)</td>
<td>4755</td>
<td>23–61 years 85% women</td>
<td>Age, sex, SES</td>
<td>Psychological distress</td>
<td>Fixed-term</td>
<td>Null</td>
<td>10.4/17.3 1.40</td>
<td></td>
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<tr>
<td>Virtanen et al. 200349</td>
<td>Random sample from the population, Finland</td>
<td>Cross-sectional (1998)</td>
<td>13 483</td>
<td>20–54 years 54% women</td>
<td>Age, sex, SES, marital status, health risk behaviour,</td>
<td>Depression</td>
<td>Fixed-term men Fixed-term women</td>
<td>Null</td>
<td>11.4/17.6 1.40</td>
<td></td>
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<tr>
<td>Study</td>
<td>Design/Metric</td>
<td>N</td>
<td>Age Range</td>
<td>Sex %</td>
<td>SES</td>
<td>Health Status</td>
<td>Employment Status</td>
<td>Health Factors</td>
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<tr>
<td>Aronsson and Goransson 1994</td>
<td>Stratified subsample</td>
<td>1564</td>
<td>&gt;30 yrs</td>
<td>78/55</td>
<td>55</td>
<td>Pos</td>
<td>Null</td>
<td>8.8/14.6, 2.97</td>
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<tr>
<td>Klein Hesselink and van Vuuren 1999</td>
<td>National labour force survey</td>
<td>1022</td>
<td>30 yrs</td>
<td>78/55</td>
<td>55</td>
<td>Pos</td>
<td>Null</td>
<td>4.9/11.4, 1.74</td>
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<tr>
<td>Martens et al. 1999</td>
<td>Patient sample from</td>
<td>160</td>
<td>Mean 34 yrs</td>
<td>35/78</td>
<td>55</td>
<td>Pos</td>
<td>Null</td>
<td>9.8/5, 1.24</td>
<td></td>
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<tr>
<td>Virtanen et al. 2001</td>
<td>Hospital employees, Finland</td>
<td>5650</td>
<td>19-63 yrs</td>
<td>88/78</td>
<td>55</td>
<td>Neg</td>
<td>Null</td>
<td>11.4/17.6, 1.40</td>
<td></td>
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<tr>
<td>Aronsson et al. 2002</td>
<td>Stratified subsample</td>
<td>2767</td>
<td>Mean 45 yrs</td>
<td>55/55</td>
<td>55</td>
<td>Pos</td>
<td>Null</td>
<td>9.9/14.6, 1.97</td>
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<tr>
<td>Rodriguez 2002</td>
<td>Household panel study, UK and</td>
<td>3127</td>
<td>&gt;15 yrs</td>
<td>40/37</td>
<td>55</td>
<td>Neg</td>
<td>Null</td>
<td>10.0/5.7, 0.57, 1.58</td>
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<tr>
<td>Virtanen et al. 2002</td>
<td>Municipal employees, Finland</td>
<td>8175</td>
<td>Mean 45 yrs</td>
<td>76/80</td>
<td>55</td>
<td>Neg</td>
<td>Null</td>
<td>12.6/18.3, 1.40</td>
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<tr>
<td>Virtanen et al. 2003</td>
<td>Hospital employees, Finland</td>
<td>4755</td>
<td>23-61 yrs</td>
<td>85/78</td>
<td>55</td>
<td>Neg</td>
<td>Null</td>
<td>10.4/17.3, 1.40</td>
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<tr>
<td>Virtanen et al. 2003</td>
<td>Random sample from</td>
<td>13483</td>
<td>20-54 yrs</td>
<td>54/55</td>
<td>55</td>
<td>Neg</td>
<td>Null</td>
<td>11.4/17.6, 1.40</td>
<td></td>
<td></td>
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<tr>
<td>Author(s) and year</td>
<td>Sample, location</td>
<td>Study design (beginning year)</td>
<td>No.</td>
<td>Age, sex</td>
<td>Potential confounders considered</td>
<td>Outcome measure(s)</td>
<td>Type of temporary employment</td>
<td>Morbidity</td>
<td>National unemployment rate/ prevalence of temporary employees (%)</td>
<td>Labour market policy activity index</td>
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<tr>
<td>Silverstein et al. 1998&lt;sup&gt;5,10&lt;/sup&gt;</td>
<td>Compensation claims incidence rate. USA</td>
<td>Prospective study, register data 1987–1995</td>
<td>186 232 claims</td>
<td>Median 32–36 years</td>
<td>None</td>
<td>Prevalence of chronic diseases</td>
<td>Fixed-term men Fixed-term women Atypical men Atypical women</td>
<td>None</td>
<td>6.2/5.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.23</td>
</tr>
<tr>
<td>Aronsson and Göransson 1999&lt;sup&gt;4,1&lt;/sup&gt;</td>
<td>Stratified subsample from labour market survey, Sweden</td>
<td>Cross-sectional (1995)</td>
<td>1564</td>
<td>22% &lt;30 years, 78% ≥30 years 55% women</td>
<td>Age, sex, SES,</td>
<td>Claims incidence of upper extremity disorders</td>
<td>Temporary help agencies&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Pos</td>
<td>8.8/14.6&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.97</td>
</tr>
<tr>
<td>Benavides et al. 2000&lt;sup&gt;3,4&lt;/sup&gt;</td>
<td>Employed persons from the sample of active population, 15 EU countries</td>
<td>Cross-sectional (1996)</td>
<td>11 782</td>
<td>≥15 years Sex distribution not reported</td>
<td>Age, sex</td>
<td>Muscular pain</td>
<td>Fixed-term</td>
<td>Pos</td>
<td>10.9&lt;sup&gt;f&lt;/sup&gt;/11.7&lt;sup&gt;f&lt;/sup&gt;</td>
<td>1.07</td>
</tr>
<tr>
<td>Failde et al. 2000&lt;sup&gt;3,7&lt;/sup&gt;</td>
<td>Hospital personnel, Spain</td>
<td>Cross-sectional (1996)</td>
<td>890</td>
<td>77% &lt;42 years 65% women</td>
<td>Age, sex, SES, tenure, BMI, no. of pregnancies, physical exercise, psychological distress</td>
<td>Back pain</td>
<td>Temporary</td>
<td>Neg</td>
<td>18.1/33.6</td>
<td>0.70</td>
</tr>
<tr>
<td>Aronsson et al. 2002&lt;sup&gt;4,2&lt;/sup&gt;</td>
<td>Stratified subsample from labour market survey, Sweden</td>
<td>Cross-sectional (1997)</td>
<td>2767</td>
<td>Mean 45 years 55% women</td>
<td>Age, sex, SES, work hours</td>
<td>Upper back/neck pain</td>
<td>Substitutes On-call</td>
<td>Null</td>
<td>9.9/14.6</td>
<td>1.97</td>
</tr>
<tr>
<td>Silverstein et al. 2002&lt;sup&gt;5,3&lt;/sup&gt;</td>
<td>Compensation claims incidence rate. USA</td>
<td>Prospective 1990–1998, register data</td>
<td>392 923 claims</td>
<td>Median 33–35 years 44%, 29%, 43% women depending on disorder</td>
<td>None</td>
<td>Work-related non-traumatic soft-tissue disorders</td>
<td>Temporary help agencies&lt;sup&gt;g&lt;/sup&gt;</td>
<td>Pos</td>
<td>5.9/4.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.20</td>
</tr>
</tbody>
</table>

SES, socioeconomic status.

<sup>a</sup> Employment type as presented in the study report.

<sup>b</sup> Compared with permanent employees (Neg refers to lower morbidity among temporary employees, Pos refers to higher morbidity among temporary employees, Null refers to no association).

<sup>c</sup> Active spending as % of Gross Domestic Product.

<sup>d</sup> Data available 1997.

<sup>e</sup> Data collection year not available (set 1 year before manuscript receipt).

<sup>f</sup> European Union mean.

<sup>g</sup> Reference all industries.

<sup>h</sup> Data available 1995.

<sup>i</sup> Data available 1995 and 1997.
<table>
<thead>
<tr>
<th>Author(s) and year</th>
<th>Sample, location</th>
<th>Study design (beginning year)</th>
<th>No.</th>
<th>Age, sex</th>
<th>Potential confounders considered</th>
<th>Outcome measure(s)</th>
<th>Type of temporary employment</th>
<th>Morbidity</th>
<th>National unemployment rate/ prevalence of temporary employees (%)</th>
<th>Labour market spending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacobson and Schelp 1988</td>
<td>Teenage working inhabitants of a small town area, Sweden</td>
<td>Prospective cohort, 1-year, social insurance register (1981)</td>
<td>762</td>
<td>15–19 years 43% women</td>
<td>None</td>
<td>Occupational injuries</td>
<td>Temporary</td>
<td>Pos</td>
<td>2.9/11.9d</td>
<td>2.10</td>
</tr>
<tr>
<td>Francois 1991</td>
<td>Industrial workers, France</td>
<td>Prospective, register data 1979–1987</td>
<td>43 940</td>
<td>Not reported</td>
<td>None</td>
<td>Non-fatal occupational injuries</td>
<td>Temporary</td>
<td>Pos</td>
<td>8.3/5.0f</td>
<td>0.70</td>
</tr>
<tr>
<td>Aiken et al. 1997</td>
<td>Hospital nurses, USA</td>
<td>Prospective, 12 349 shifts during 1 year (1990)</td>
<td>12 349</td>
<td>Not reported</td>
<td>None</td>
<td>Occupational injuries</td>
<td>Temporary</td>
<td>Null</td>
<td>5.6/n.a.</td>
<td>0.23</td>
</tr>
<tr>
<td>Kirschenbaum et al. 2000</td>
<td>Patient sample, Israel</td>
<td>Retrospective (1998)</td>
<td>200</td>
<td>Mean 38 years 18% women</td>
<td>Sex, marital status, SES, work conditions, life situation</td>
<td>Occupational injuries</td>
<td>Subcontract</td>
<td>Pos</td>
<td>8.5/n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Nola et al. 2001</td>
<td>Registers from 16 temporary agencies Italy</td>
<td>Prospective, 1-year register data (2000)</td>
<td>250 000</td>
<td>Mean 28 years for injured Sex distribution not reported</td>
<td>Reference groups homogeneous (unskilled workers)</td>
<td>Occupational injuries</td>
<td>Temporary agency</td>
<td>Pos</td>
<td>10.4/10.1</td>
<td>1.12</td>
</tr>
<tr>
<td>Amuedo-Dorantes 2001</td>
<td>Random sample from national register, Spain</td>
<td>Retrospective survey 1997</td>
<td>3804</td>
<td>Mean age 37 years 35% women</td>
<td>Sex, job tenure, occupation, education, hours of work, working conditions</td>
<td>Occupational injuries</td>
<td>Fixed-term Specific task Other temporary</td>
<td>Neg</td>
<td>17.0/33.6</td>
<td>0.70</td>
</tr>
<tr>
<td>Kivimäki et al. 2003</td>
<td>Municipal workers, Finland</td>
<td>Prospective, register data 1990–2001</td>
<td>75 304</td>
<td>18–63 years 72% women</td>
<td>Age, sex, SES</td>
<td>Mortality Overall</td>
<td>Fixed-term men Fixed-term women</td>
<td>Pos</td>
<td>11.4/16.1f</td>
<td>1.35</td>
</tr>
<tr>
<td>Salminen et al. 2003</td>
<td>Hospital personnel, Finland</td>
<td>Prospective cohort, register data 1998–1999</td>
<td>5111</td>
<td>62% aged 31–50 years 88% women</td>
<td>None</td>
<td>Occupational injuries</td>
<td>Fixed-term</td>
<td>Null</td>
<td>10.2/17.3</td>
<td>1.40</td>
</tr>
</tbody>
</table>

SES, socioeconomic status.

a Employment type as presented in the study report.

b Compared with permanent employees (Neg refers to lower morbidity among temporary employees, Pos refers to higher morbidity among temporary employees, Null refers to no association).

c Active spending as % of Gross Domestic Product.

d Data available 1985.


<table>
<thead>
<tr>
<th>Author(s) and year</th>
<th>Sample, location</th>
<th>Study design (beginning year)</th>
<th>No.</th>
<th>Age, sex</th>
<th>Potential confounders considered</th>
<th>Outcome measure(s)</th>
<th>Type of temporary employment</th>
<th>Morbidity&lt;sup&gt;a&lt;/sup&gt;</th>
<th>National unemployment rate/ prevalence of temporary employees (%)</th>
<th>Labour market spending&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benavides et al. 2000&lt;sup&gt;44&lt;/sup&gt;</td>
<td>Employed persons from the sample of active population, 15 EU countries</td>
<td>Cross-sectional (1996)</td>
<td>11 782</td>
<td>≥15 years</td>
<td>Sex distribution not reported</td>
<td>Sickness absence (≥1 day/year)</td>
<td>Fixed-term Temporary agency</td>
<td>Null</td>
<td>10.9/11.7&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.07</td>
</tr>
<tr>
<td>Kaminski 2001&lt;sup&gt;33&lt;/sup&gt;</td>
<td>Managers of 86 plants, USA</td>
<td>Prospective, 2 years (1996)</td>
<td>86 plants</td>
<td>Not reported</td>
<td>Industry, unionization, productivity, capital intensity, pay, workhours, training, team, production line</td>
<td>Sickness absence (days) due to injuries</td>
<td>Temporary (% in a plant)</td>
<td>Null</td>
<td>5.2/4.6&lt;sup&gt;e&lt;/sup&gt;</td>
<td>0.17</td>
</tr>
<tr>
<td>Virtanen et al. 2001&lt;sup&gt;38&lt;/sup&gt;</td>
<td>Hospital personnel, Finland</td>
<td>Prospective cohort, register with 2-year follow-up (1998)</td>
<td>5650</td>
<td>19–63 years 88% women</td>
<td>Age, sex, SES, marital status, no. of children, work schedule, self-rated health</td>
<td>Sickness absence spells (self-certified)</td>
<td>Fixed-term women Fixed-term men</td>
<td>Neg</td>
<td>10.2/17.3</td>
<td>1.40</td>
</tr>
<tr>
<td>Amuedo-Dorantes 2002&lt;sup&gt;46&lt;/sup&gt;</td>
<td>Random sample from national register, Spain</td>
<td>Retrospective survey 1997</td>
<td>3804</td>
<td>Mean age 37 years 35% women</td>
<td>Sex, job tenure, occupation, education, hours of work, working conditions</td>
<td>Sickness absence</td>
<td>Fixed-term Specific task Other temporary</td>
<td>Neg</td>
<td>17.0/33.6</td>
<td>0.70</td>
</tr>
<tr>
<td>Virtanen et al. 2003&lt;sup&gt;37&lt;/sup&gt;</td>
<td>Hospital personnel, Finland</td>
<td>Prospective cohort, register with 3-year follow-up (1997)</td>
<td>4755</td>
<td>23–61 years 85% women</td>
<td>Age, sex, SES</td>
<td>Sickness absence spells (medically certified)</td>
<td>Fixed-term</td>
<td>Neg</td>
<td>11.4/17.2</td>
<td>1.40</td>
</tr>
<tr>
<td>Vahitaa et al. 2004&lt;sup&gt;36&lt;/sup&gt;</td>
<td>Municipal personnel, Finland</td>
<td>Prospective cohort, register with 8-year follow-up (1991, 1994–2000)</td>
<td>22 430</td>
<td>18–65 years 74% women</td>
<td>Age, sex, SES, baseline sickness absence</td>
<td>Sickness absence spells (medically certified)</td>
<td>Fixed-term</td>
<td>Neg</td>
<td>11.4/16.1&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.35</td>
</tr>
<tr>
<td>Virtanen et al. 2004&lt;sup&gt;34&lt;/sup&gt;</td>
<td>Municipal personnel, Finland</td>
<td>Prospective cohort, register with 4-year follow-up (1997–2000)</td>
<td>3205</td>
<td>75% women in permanent, 78% women in fixed-term</td>
<td>None</td>
<td>Sickness absence spells (self-certified) Sickness absence spells (medically certified)</td>
<td>Fixed-term Null</td>
<td>11.0/17.3</td>
<td>1.40</td>
<td></td>
</tr>
</tbody>
</table>

SES, socioeconomic status.

<sup>a</sup> Employment type as presented in the study report.

<sup>b</sup> Compared with permanent employees (Neg refers to lower morbidity among temporary employees, Pos refers to higher morbidity among temporary employees, Null refers to no association).

<sup>c</sup> Active spending as % of Gross Domestic Product.

<sup>d</sup> European Union mean.

<sup>e</sup> Data available 1997.
reports showed an increased risk of occupational injuries among the temporary workers (Table 2).

**Results by instability of temporary employment**
The meta-analysis across all the studies indicated that the combined odds ratio of morbidity/mortality among the temporary workers was 1.13 (95% CI 0.88–1.45) and $Q$ for heterogeneity = 745.40, $P$-value $< 0.001$ (Figure 2). The meta-regression showed that the association was stronger the higher the instability of temporary employment was ($z = 3.46$, $P = 0.001$) (result not shown in the Figure).

**Results by other modifying factors**
Contextual factors modified the association between temporary employment and morbidity; the morbidity was stronger the lower the unemployment rate was ($z = -3.54$, $P \leq 0.001$; Figure 2), and the lower the proportion of temporary employees was ($z = -3.12$, $P = 0.002$). The outcome type (classified as presented in the previous section) was one of the factors explaining heterogeneity between the studies ($z = -2.09$, $P = 0.037$). The labour market activity index, the proportion of women, and the study type did not modify the association between temporary employment and morbidity.

We did not find evidence of publication bias (with Egger’s weighted regression method; $t = -1.46$, $P = 0.157$). In the reviewed studies, a high unemployment rate was related to a high proportion of temporary employees within a country (Pearson correlation $r = 0.69$, $P < 0.001$). We found a similar, although weaker, association ($r = 0.45$, $P = 0.047$) from the general statistics including 18 European countries, the United States, and Canada in 2001 (figures not shown). This implies that the reviewed data may be generalizable to other populations.

**Discussion**
This review suggests a relationship between temporary employment and increased psychological morbidity. Temporary employment may also be associated with a higher risk of occupational injuries and lower sickness absence rates than permanent employment. The meta-analysis showed a high degree of heterogeneity between the studies. A part of the heterogeneity is explained by the differences in the health outcomes, the type of temporary employment as well as by different contextual factors within the study countries. In addition to these, some unknown confounding and selection bias may also have distorted the findings. Therefore, the present meta-analysis should be considered as an explorative inspection of the current research.

Many of the reviewed studies were cross-sectional, and therefore unable to demonstrate temporal order between exposure and health. However, several potential explanations may be provided for the observed associations. The relationship between temporary employment and increased psychological morbidity may reflect the adverse effect of job insecurity on mental health. The higher risk of occupational injuries among temporary employees may be related to their greater inexperience and lack of induction and safety training at the workplaces. Some of the studies on occupational injuries might also have been biased by confounding related to
occupation. A lower sickness absence rate among temporary workers may be related to the insecure position they have in the labour market and sickness presenteeism, working while ill, due to a fear of job loss. The lower levels of sickness absence may also reflect better physical health among temporary workers, as suggested in some surveys.

Prospective cohort studies offer the best observational design for questions on the aetiology of ill health. The prospective studies in our review concerned Finnish hospital personnel, Finnish municipal workers, a teenage population from a small town in Sweden, and population-based samples from Great Britain and Germany. These studies showed lower morbidity among the temporary hospital staff and equal or higher morbidity among temporary municipal workers, a higher incidence of occupational injuries among temporary teenage employees, higher morbidity among temporary employees in Germany, and equal morbidity in Great Britain. Variation in the quality of the study may not necessarily be the main cause of heterogeneity in the results. Several other sources of heterogeneity are discussed in detail in the following sections.

Study population and exposure
A random sample from the whole population would be the best in terms of the generalizability of the results to the total workforce of a given country. We did not find sample type to be a source of heterogeneity between the studies. However, the sensitivity analysis of the Type II meta-analysis (published data) may have low statistical power to detect heterogeneity present. The present review partially comprised of industry-specific studies; this somewhat limited the generalizability of the results. Therefore, a greater number of industry-specific studies are needed to detect whether the health effects are industry-specific, and a greater number of population-based studies is needed to increase the generalizability of the results.

Heterogeneity in exposure to temporary employment refers to both qualitative and quantitative aspects. ‘Qualitative heterogeneity’ means a lack of specificity in the definition of temporary employment. Such heterogeneity was obvious in some of the reviewed studies, in which, for example, the term ‘temporary employment’ referred to a large variety of different forms of non-permanent employment arrangements.

In a similar vein, studies on ‘low instability’ fixed-term jobs in Scandinavia have not indicated large differences in work conditions between fixed-term and permanent workers. However, as legislative protection for temporary work...
arrangements varies between countries. Exposure to health risks may differ even within a certain group of temporary employees (e.g. temporary agency workers).

‘Quantitative heterogeneity’ in exposure, which refers to differences in the time period spent in temporary and permanent employment, was not controlled for in any of the reviewed studies, except those examining the sickness absence rates. Temporary employees may have more intermittent employment histories with periods of unemployment, for example, than have permanent workers. Therefore, their exposure to work may be overstated and exposure to unemployment may be a confounding factor not estimated in the studies. Temporary employment is also more common among younger people with shorter tenure in the labour market. This bias is linked with a larger phenomenon observed in occupational studies, namely, the ‘healthy worker effect’.

Healthy worker effect

Even though age was controlled in most of the studies, the ‘healthy worker effect’ may have biased the results. This bias operates through three time-related factors, the ‘healthy hire effect’ (i.e. the healthiest members of the labour market reserve are the most likely to seek and gain employment), and the ‘wearing off of selection’ (i.e. time since hire is likely to be associated with cumulative exposure to hazards and the attenuation of the healthy worker effect among employees), and the ‘healthy worker survivor effect’. The wearing off of selection may be more pronounced among the permanent employees whereas the healthy worker survivor effect relates to the out-selection of less healthy workers, which may operate more strongly among temporary staff.

The bias caused by the healthy worker effect in sample attrition may partially explain the findings of lower morbidity among temporary workers. Studies on municipal workers in Finland give a good example. In one survey, temporary workers reported lower morbidity than permanent employees did. In contrast, a 12-year register-based study on a population without sample attrition, also including employees with very short work contracts, showed increased mortality among temporary employees. Large personnel reductions were made during the 12-year study period. A potential explanation for the discrepant results is clustering of health risks among people whose work career is characterized by transitions between very short periods of work and unemployment. These high-risk people are the most likely to be lost in surveys. Indeed, an unpublished analysis indicated that the association between temporary employment and mortality disappeared when temporary employees with very short contracts were excluded from the analysis.

Contextual effects

We found some indication of a relationship between morbidity among temporary employees and the national proportion of temporary employees and unemployed people. Higher morbidity was most consistently found for temporary workforces in countries with a low proportion of temporary employees and a low unemployment rate. For several reasons, the differences in the relative size of the peripheral workforce (i.e. temporary workers and the unemployed) may be related to health in association with temporary work.

First, a large peripheral workforce may be more heterogeneous in its demographic characteristics than a small peripheral workforce. Statistics from European countries show that temporary employment is more common among more highly educated people than among those with less education in countries in which the proportion of temporary employment is high, for example, in Spain, Finland, and Sweden. In contrast, temporary employment is more common among less educated people in countries in which the proportion of temporary employment is low, such as in the US, Germany, and Belgium. Studies on a large and more heterogeneous temporary workforce may produce mixed results if the type of employment is not stratified by socioeconomic position, or if the studied subgroup of temporary employees consists of people from a very restricted number of occupations (e.g. specialists working on projects). Studies from a small and more homogeneous peripheral workforce with mainly manual occupations may result in higher morbidity because these jobs may be more likely to include ‘bad job’ characteristics.

Second, health-related selection may operate differently depending on the size of the peripheral workforce in the country. When the number of people outside the core workforce is high, flexibility in the use of the workforce concentrates in the periphery. This phenomenon enables, and may, as well, be a consequence of higher protection for permanent workers. When permanent employees are well protected from redundancy, occupational cohort selection may operate differently among them than among the peripheral workforce. A greater ‘wearing off of selection’ eventually leads to increased morbidity among permanent workers who also may have a higher workload due to tutoring and other responsibilities. The ‘healthy hire effect’ and the ‘healthy worker survivor effect’ are more pronounced among the temporary employees and both decrease the likelihood of morbidity in this group.

Selection among temporary staff may also depend on the national unemployment rate. Research has shown that unemployment is less associated with morbidity during high unemployment than during low unemployment indicating that the selection into unemployment for health-related reasons is not as strong during high unemployment. Our review showed a relationship between high national unemployment and low morbidity among temporary workers. When the unemployment rate is high, a larger ‘health reserve’ exists among the unemployed. In this situation, employers are more likely to find and recruit healthy workers (into temporary jobs) from the reserve of unemployed people than when there is a workforce shortage. Similarly, when competition for jobs is harsh among temporary workers, employees with health problems may be more likely to lose their jobs.

In countries with a large proportion of permanent employees and a small peripheral workforce, permanent employees may be less protected from redundancy. If the unemployment rate is also low, health-related selection may occur from permanent employment into temporary work and unemployment.

There may also be differences between the unemployment rates and job insecurity between different occupational groups within a country. Some temporary workers may have a high status in the labour market because of a labour shortage. Furthermore, the important consideration in studying temporary work is the
location and voluntariness of temporary work in one’s work career. For younger people, temporary employment may be a stepping stone into permanent work or a voluntary choice during the studies. The adverse effects on health may be seen especially if temporary work is associated with downward social mobility in later life, for example, after layoff.

The size of the peripheral workforce may be associated with several factors other than socioeconomic status and health-related selection. Such factors (e.g. national legislation to protect temporary employees, social security for the unemployed, and access to health care among the temporarily employed and unemployed people) may contribute to the stratification of the labour market by employment status and health. Future research should focus on ways in which status in the core-periphery axis of the labour market and other axes of social inequality intersect as causes and consequences of ill health.

Conclusions

Although many studies have been conducted, more research is still needed before firm conclusions can be drawn about the relationship between temporary employment and health. We have four recommendations. First, a major effort should be made to develop a consistent definition of different types of temporary employment and to systematically sample workers according to this definition.

Second, future research needs to further examine the mechanisms through which temporary employment is associated with psychological morbidity. For example, if insecurity is a mediating factor in the relationship between temporary employment and health, one would particularly expect to see findings with respect to stress-related morbidity, such as mental health problems and cardiovascular diseases.

Third, the relative contribution of ‘the healthy worker effect’ and the causal effect of temporary employment on health should be examined. This objective is best realized with prospective study designs and total populations of specific geographic communities (e.g. countries), and in follow-up studies of people who change from one employment status to another. In practice, this recommendation implies that the whole life course of the participants should be assessed. People with health problems may have a history of accumulated hazards, in terms of poor social circumstances and psychosocial adversity. This history may make them more vulnerable to hazards encountered later in life. An important challenge for future research would be to distinguish the extent to which risks originating from sources other than temporary work, e.g. social disadvantage in childhood and adolescence, account for the association between temporary employment and health.

Fourth, the context in which temporary employment is studied should be accounted for. The proportion of the peripheral workforce and the unemployment rate are likely to have some effect on the association between temporary employment and health. National employment protection and social security legislation are also important contextual factors referring to ‘bad job’ characteristics in relation to poor wages, poor social security, job insecurity, and a lack of unionization and industrial safety. A related issue involves underemployment and fragmentary work (e.g. involuntary part-time jobs), which may result in an insufficient amount of time employed during individual’s work career.

Acknowledgements

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KEY MESSAGES

- The modern flexible economy is characterised by the increasing use of temporary employment arrangements.
- Although many studies have begun to accumulate, no agreement exists whether temporary employment is a health risk.
- The present review indicates an association between temporary employment and psychological morbidity.
- The health risk may depend on instability of temporary employment, unemployment rate and proportion of temporary employees within the country.
- Additional research to clarify the role of employment instability, hazard accumulation and health-related selection is recommended.

References

TEMPORARY EMPLOYMENT AND HEALTH


52 Recent labour market developments and prospects. Special focus on labour market policies: How the money has been spent. *OECD Employment Outlook* 2001, Chapter 1, 2001, pp. 11–35.


