Changes in occupational mental and physical health and health symptoms during the economic recession

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Received 7 September 2015
Accepted 25 July 2016

Abstract.
BACKGROUND: In 2008, many Western countries faced a great economic recession, the result of which was increased unemployment and reduced public expenditure.
OBJECTIVE: This article focuses on changes in the self-reported mental and physical health and health symptoms of the remaining employees of Icelandic municipalities who worked within the educational system and the care service during the economic recession. We examine gender differences in health and differences between downsized workplaces and workplaces where no downsizing occurred and differences between workplaces with heavy workload and light workload.
METHODS: The study is based on a balanced panel online survey and focus groups.
RESULTS: The main finding is that both the mental and physical health of employees deteriorated year by year between 2010, 2011 and 2013 in all workplaces although the downsized workplaces and workplaces with heavy workloads fared worse. At the same time, public expenditure on the health care system was reduced.
CONCLUSIONS: We hope that our results encourage further studies in the field and that they will be taken into account when dealing with prevention and rehabilitation initiatives.

Keywords: Downsizing, health symptoms, self-reported health, workload, mixed method

1. Introduction

Work shapes our everyday lives, affects our self-esteem and influences how other people think about us. Thus, employment status is one of the major factors influencing quality of life and well-being [1, 2], not least in countries like Iceland, where the labour market participation is high, unemployment low and people in general work long hours [3]. In 2014, the employment rate was higher in Iceland (81.6%) than in other Organisation for Economic Co-operation and Development (OECD) countries (49.4–79.8%). Labour market participation was high for both men (84.0%) and women (79.3%) [4]. In 2014, the average number of working hours per week in Iceland was 43.9 hours for men and 35.2 hours for women [5].

In 2008, the Icelandic nation faced the worst economic downturn in history during peacetime when all three of the major banks collapsed and triggered an economic crisis. Even though the collapse of the Icelandic banks is related to the global financial crisis, the unique set of circumstances made the recession deeper than in most other European countries [6]. The economic crisis has had serious adverse effects on Icelandic society as a whole and specifically on
households and the livelihoods of its citizens. Unemployment went from 1.2% in August 2008 (1.6% for women and 1.0% for men) to 7.7% (7.5% for women and 7.9% for men) one year later. Peak unemployment occurred in the beginning of 2010 when the figure reached 9.3% [7]. Unemployment under 10% may seem to be small in an international context, but it is very high for a nation that prior to the recession had hardly any unemployment.

Available evidence shows that health is at risk in such times of rapid economic change, actually in both booms and busts [8]. Before 2008, the Icelandic economy had grown very fast, especially between 2003 and 2008 [9], which made the economic and the “psychological” shock even greater when the banks fell. According to McDaid et al. [10] this latest economic recession has led to poorer health, rising incidences of some communicable diseases and higher suicide rates in Europe. They also argue that the available data are likely to underestimate the broader mental health crisis linked to increased rates of stress, anxiety and depression among the economically vulnerable. By focusing on both mental and physical health among female and male employees, based on longitudinal panel data and focus group interviews, the current article contributes to the understanding of occupational health in times of economic recession. Several studies have indeed focused on mental health and recession through the years [11–14], while studies on physical health are rare. In addition, the gender focus is often neglected [15].

1.1. Economic recession and health

An unexpected crisis of the magnitude of the October 2008 bank collapse can be categorized as a stressful negative life event. It can affect multiple aspects of the well-being of an individual—not only financial but also social, psychological and physical aspects. According to a study by Asgeirs-dottir et al. [16] the effects can be both negative and positive. They show that the Icelandic crisis led not only to a large and significant reduction in health-compromising behaviours (such as smoking, drinking alcohol or soft drinks and eating sweets) and certain health-promoting behaviours (such as the consumption of fruits and vegetables), but also to increases in different health-promoting behaviours (such as the consumption of fish oil and getting the recommended amount of sleep). Nevertheless, most studies highlight the negative effects of crises on health and well-being. Kondo et al. [17] show that after the economic crisis in Japan in the 1990s, health declined across all socioeconomic groups. Their results are in line with Althouse et al. [18] who show that worsening physical health—such as arrhythmia, back pain, cancer, congestion, chest pain, gastric pain, headaches, hernia and joint pain—was associated with the great recession in the USA (December 2008 through 2011). Guðjónsdóttir et al. [19] also point out a connection between the recession in Iceland and increased cardiovascular symptoms. Several studies indicate increased mental health problems following economic recessions, such as anxiety and/or depression [11–14], psychological distress [20] and perceived stress [21].

The above-mentioned studies focused on the general population. Several studies have focused on the health effects of downsizing for remaining employees. These studies have shown a negative impact on health, for example, due to increased workloads or job insecurity, for employees who do not lose their jobs in times of recession [see, e.g. 20, 22–24]. Some of these studies have shown increased depression, anxiety and emotional exhaustion [25, 26] and increased sickness and sickness absence [27]. Modrek and Cullen [28] have shown an increased risk of developing hypertension and diabetes among remaining employees working in workplaces with the highest number of layoffs.

Some studies have found gender differences in health following economic downturns, but the results are conflicting. For example, in their study of the general population of England before and after the 2008 recession, Katikireddi et al. [11] found a higher prevalence of mental problems in men than women within two years of the recession. These changes could not be accounted for by differences in employment status. In their study of the general population of Iceland before and after the 2008 recession, Hauksdottir et al. [21] found increased stress levels only among women, especially those who were unemployed. In line with those findings, Kessler et al. [29], Needham and Hill [30] and Seedat et al. [31] found that in the wake of an economic crisis, women exhibit higher rates of affective disorders, such as anxiety and depression, while men exhibit higher rates of behavioural disorders, such as substance abuse and antisocial behaviours. When analysing health and wellbeing among employees in the fallen Icelandic banks, Snorradóttir et al. [15] found that more women than men were psychologically or financially distressed and claimed to be shocked by the lay-off.
1.2. The Icelandic context

One of the consequences of the economic crisis in Iceland was that the real exchange rate (RER) fell by 25% between 2008 and 2009, and inflation increased from 6.0% in 2008 to 18.6% in January 2009 [32]. These two factors had severe effects on mortgages taken by many families. Furthermore, during the crisis, a large number of Icelanders lost their savings and became burdened with serious debt. Generally speaking, the financial situation of households deteriorated significantly after the collapse. In 2009, a year after the economic crisis began, 39% of households were struggling to make ends meet, and that percentage rose to nearly 52% in 2011 [33]. Another consequence of the economic crisis was a change in total health care expenditure. In 2013, the total expenditure on health was 8.8% of Iceland’s GDP. The health expenditure per capita was 436 thousand ISK in 2014 and has decreased by 10.3% in real terms since 2008 [34].

In many communities, the municipalities are the largest employer, especially in smaller and rural areas [35]. Although the crisis did not hit Icelandic municipalities as hard as the banking and retail sectors, many municipalities reacted with cutbacks in services and construction projects [36]. Wages are the largest single expenditure for the municipalities, around 60% of their total revenue [35]. Due to the crisis, some municipalities reduced their wage costs by cutting down overtime, not hiring new staff, offering voluntary retirement and restructuring jobs. In addition, many of the municipalities laid off employees, which was very uncommon in the public sector before the crisis.

Using electronic medical records of the National University Hospital, Guðjónsdóttir et al. [19] explored potential changes in emergency unit visits in Reykjavík immediately following the economic collapse. Their results show a significant increase in visits to the cardiac emergency unit in the week of the collapse and the days thereafter. The increase was higher for women than for men. A similar increase was not observed in general emergency units that week or any other week or at the cardiac emergency unit in other weeks. An increase was also recorded in the number of women visiting with complaints of ischemic heart disease. Such an increase was not detected for men in the week of the collapse. The increase did not last long, and the visits were normal the week after the collapse. The authors concluded that the dramatic economic collapse in Iceland in October 2008 was the main reason for the immediate short-term increase in women’s visits to the cardiac emergency unit.

Drawing on Sigursteinsdóttir et al. [27], showing an increase in sick leave during the recession, we explore the relationship between time and mental and physical health to see if and how health has changed two, three and five years after the crisis hit the county. We analyse 14 reported health symptoms that have interfered with the daily lives of study participants since the crisis. These health symptoms are sleep disturbances, extreme worry, anxiety and sadness, lack of strength, myositis, pain in the back/shoulders, frequent headaches, abdominal pain, dyspnea, arrhythmias, hypertension, colon spasms and colds/fevers. The research questions are: (1) Did self-reported mental and/or physical health of employees deteriorate after the economic collapse in October 2008? (2) What are the effects of gender, age, downsizing and workload on self-reported mental and physical health of employees over time? (3) Which mental and physical symptoms were the most common and most marked changes over time?

The data are unique as this is, as far as we know, the only research on occupational health among municipality employees during economic recession in Iceland, using a longitudinal balanced panel survey (three time points) of all employees of the selected municipalities in combination with focus group discussions.

2. Materials and methods

The article is based on a longitudinal study of the health and well-being of employees of municipalities in Iceland in times of economic crisis. The study was approved by the National Bioethics Committee in Iceland (VSN10-007). The participants came from 20 of the 74 municipalities in Iceland, covering about 50% of those who are employed by the municipalities. We requested participation from all 22 municipalities with more than 2,000 inhabitants; 20 agreed to participate in the study and two declined. One of the excluded municipalities was the capital city, which is by far the largest municipality in Iceland, with about 38% of total municipal employees. Two complementary approaches were used for data collection: online surveys and focus groups. The online surveys were used to examine the prevalence of mental and physical health symptoms interfering with the daily lives of participants. Focus group interviews were used to
gain insights into attitudes, feelings, beliefs, experiences and reactions pertaining to (lack of) well-being and the collapse.

2.1. Online survey and sample

Three online surveys were conducted, the first in February–April 2010 (baseline study), the second in May–June 2011 (follow-up study 1) and the third in February–April 2013 (follow-up study 2). All employees with permanent positions (50% or higher) were included in the survey sample. The survey was sent to 7,329 employees in 2010, 4,724 of whom responded (a response rate of 65%) after three e-mail reminders. The response rate of the original cohort still at work was 62% in 2011 and 66% in 2013. In this article, we only used answers from two occupation groups—education (kindergarten teachers and primary school teachers) and care service (elder care and care for people with disabilities) employees, who responded to the survey at all three time points—in order to monitor changes for each individual. These occupational groups are particularly interesting because of prior job security and close contact with large numbers of families in the communities.

In 2010, the number of employees in education and care services was 5,717. Of these, 4,542 responded to the questionnaire (79%). Of the 4,542 baseline respondents, 4,415 were still working 16 months later at the time of follow-up study 1, and 3,359 (76%) responded to the questionnaire the second time. Of the 3,359 follow-up study 1 respondents, 3,258 were still working 20 months later at the time of follow-up study 2. Of these, 2,356 responded to the questionnaire the third time (a 72% response rate).

The majority of municipality employees in the education and care service sectors and thus also participants in the study were women (87.4%). The average age was a little over 48 for both women and men, 66.4% worked as primary school teachers, 24.3% worked as kindergarten teachers and 9.3% worked in caring for the elderly or disabled people. The number of participants varied slightly in the analyses due to some missing values for the predictor variables.

2.2. Survey questions

The questionnaire devised for this study was based on two well-tested questionnaires, the Icelandic version of the General Nordic questionnaire for psychological and social factors at work (QPS Nordic) and the questionnaire from Health and well-being of the Icelandic nation, a publication produced by the Icelandic Public Health Institute. Additional questions were added about personnel reductions and internal reorganization. In this article, we use three questions about self-reported mental and physical health where the respondents were asked about their mental and physical health before and after the economic crisis.

The independent variables were gender (male/female), age (year of birth), downsizing and workload. Downsizing was measured with one question: ‘Have employees in your organization been laid off because of the economic collapse that occurred in October 2008?’ This was a yes/no question. Workload was measured with two questions: ‘Do you have too much to do?’ and ‘Is it necessary to work at a rapid pace?’ There were five response options for those questions: 1 = very seldom or never; 2 = rather seldom; 3 = sometimes; 4 = rather often and 5 = very often or always. These two questions were combined into one variable called workload (Spearman–Brown coefficient = 0.73–0.76).

The dependent variables were mental and physical health. These were measured with the following two questions: ‘Is your mental health better or worse than it was before the economic collapse that occurred in October 2008?’ and ‘Is your physical health better or worse than it was before the economic collapse that occurred in October 2008?’ There were five response options for those two questions: 1 = much better than before the economic collapse in October 2008; 2 = somewhat better than before the economic collapse in October 2008; 3 = the same as before the economic collapse in October 2008; 4 = somewhat worse than before the economic collapse in October 2008 and 5 = much worse than before the economic collapse in October 2008. Regarding health symptoms, the question was: ‘Do any of the following symptoms interfere with your daily life: lack of strength, myositis, pain in the back/shoulders, frequent headaches, abdominal pain, dyspnea, sleep disturbances, extreme worry, anxiety, sadness, arrhythmias, hypertension, colon spasms and colds/fevers?’ There was a choice of four responses: 1 = Yes, since the economic collapse occurred in October 2008; 2 = Yes, but only before the economic collapse occurred in October 2008; (3) Yes, both before and after the economic collapse occurred in October 2008 and 4 = No, never. The first response was used for this analysis, as we were only
interested in the impact of the economic collapse. An overall measure of mental and physical health symptoms was created by summing up the number of mental symptoms (0–4) and physical symptoms (0–10) according to the principal components analysis.

2.3. Statistical analysis

Cochran’s Q test was used to explore the impact of time on self-reported mental and physical health and downsizing. Principal components analysis with oblique rotation (direct oblimin) was conducted on the 14 health symptoms to explore the interrelationship among them. A repeated-measures ANOVA was conducted to explore whether changes in the reported number of mental and physical health symptoms depended on gender, age, downsizing, workload and changes in workload. SPSS version 21.0 was used for data analysis.

2.4. Focus groups

Seven focus group discussions were conducted in two municipalities in January and February of 2010. These two municipalities are of a similar size and have both laid off employees due to downsizing following the crisis. One is located within the capital area and the other is outside the capital area. However, we do not compare the results between municipalities. The purpose of the focus groups was to gain further insights into the health and well-being of municipality employees in a time of economic crisis and to examine the nature of certain beliefs in order to complement the results of the online survey. The personnel managers in both municipalities encouraged employees aged 25 and older who had been working in their current workplace for at least six months prior to the economic crisis to participate in the focus groups. All participants gave written informed consent.

Primary school teachers formed two groups, kindergarten teachers formed three groups and elder care workers and providers of care to disabled people formed one group each. The seven focus groups consisted of 39 employees (workers and middle management), 34 women and five men, which reflects the gender ratio of the employees. The average age was 42 (range: 25–58 years).

The focus group discussions were moderated by the authors using a semi-structured discussion guide to ask the participants about changes in the workplace after the economic crisis and the impact of the crisis on them personally and on their workplaces. The participants were encouraged to discuss the topic freely. Each focus group lasted approximately 60–90 minutes. The discussions were recorded and transcribed verbatim. The coded key word approach was used to analyse the data. The focus groups’ transcriptions were read thoroughly, and a code/key word was assigned to each comment to identify themes and categories within the text. The quotes were translated from Icelandic into English.

3. Results

As shown in Table 1, 24% of participants reported worse mental health after the collapse in the first study (2010), and the proportion rose to 30% in 2011 and to more than 36% in 2013. The same trend was observed for physical health, although the proportions were lower. More than 12% reported worsened physical health after the collapse in the first study (2010), and the proportion rose to 18% in 2011 and to nearly 26% in 2013.

The results showed that 27.4% of participants reported that employees in their organization had been laid off because of the economic collapse at the first time point of the study. The proportion rose to 45.8% in 2011 and to 51.2% in 2013 ($\chi^2 (2, 2356) = 771.2; p < 0.001$). Furthermore, workloads had increased significantly between all time points of the study ($\chi^2 (2, 2356) = 35.1; p < 0.001$). Both self-reported mental and physical health were significantly worse in workplaces where downsizing had occurred than in workplaces with no downsizing at all time points of the study and in workplaces with heavy workloads compared to light workloads (see Table 1).

According to the focus groups, the mental and physical health of employees worsened after the economic collapse in October 2008. As the collapse affected all the employees in one way or another, they were generally more vulnerable than before, and some were very angry. As one kindergarten teacher said:

*People are still very angry over what occurred and they do not understand how this could happen. Many people have lost everything and their spouses even lost their jobs. In general, they are very sad and they do not feel well. But they try*
to hide it. This has affected many employees both physically and mentally.

The participants pointed out that employees were not as patient with each other as before the collapse, and this led to increased communication problems in the workplace. Most employees experienced increased personal strain in the wake of the collapse. This was not only because of more financial problems but also because of increased workloads and sickness-related absences without the absent employees being replaced. In addition, the employees also experienced an increased psychosocial strain due to difficulties in their clients’ families. In the discussions, teachers at both kindergartens and primary schools argued that the children were more tired and irritated now than before the collapse. The number of difficult children increased since the collapse, and more children used violence than before. Employees working with older individuals and people with disabilities were of the same opinion. They described their work as more difficult after the collapse, as the residents had become more difficult to deal with. Their frustration and irritability had increased, and some were acting more violently than before.

Table 2 shows the proportions of 14 reported health symptoms that interfered with the daily lives of participants since the economic crisis in October 2008 for all three time points of the study. All these symptoms increased statistically between the time points of the study, except colds/fevers and colon spasms. The most common symptom reported was sadness, but 35% of participants had suffered from sadness before.

Table 2 shows the proportions of 14 reported health symptoms that interfered with the daily lives of participants since the economic crisis in October 2008 for all three time points of the study. All these symptoms increased statistically between the time points of the study, except colds/fevers and colon spasms. The most common symptom reported was sadness, but 35% of participants had suffered from sadness before.
in October 2008, two new variables were created. The analysis with oblique rotation showed that a two-component solution explained a total of 47% of the variance. There was a positive correlation between the two components (r = 0.33). Table 3 shows the factor loadings after rotation. The items that cluster on the same factor suggest that factor 1 represents physical health symptoms (alpha = 0.74) and factor 2 represents mental health symptoms (alpha = 0.80).

An overall measure of mental and physical health symptoms was created by summing up the number of mental symptoms (0–4) and physical symptoms (0–10).

The number of mental and physical health symptoms reported increased as time passed after the economic collapse. The average number of reported mental health symptoms was 2.55 in 2010; this rose to 2.70 in 2011 and to 2.80 in 2013. The same trend was observed for all demographics, downsized and not downsized workplaces and workloads. The number of mental health symptoms reported by participants in workplaces where downsizing occurred was significantly higher than in workplaces where no downsizing occurred at all time points. Furthermore, the number of mental health symptoms reported by participants in workplaces with heavy workloads was significantly higher than in workplaces with light workloads.

The average number of reported physical symptoms was 2.61 in 2010; this rose to 2.65 in 2011 and to 2.66 in 2013. Unlike mental health symptoms, physical health symptoms did not increase much between

<table>
<thead>
<tr>
<th>Item</th>
<th>First study 2010</th>
<th>Follow-up study 1 2011</th>
<th>Follow-up study 2 2013</th>
<th>Cochran’s Q test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sadness</td>
<td>824</td>
<td>1020</td>
<td>1179</td>
<td>521.2***</td>
</tr>
<tr>
<td>Anxiety</td>
<td>723</td>
<td>908</td>
<td>1041</td>
<td>473.8***</td>
</tr>
<tr>
<td>Sleep disturbances</td>
<td>641</td>
<td>827</td>
<td>987</td>
<td>469.7***</td>
</tr>
<tr>
<td>Extreme worry</td>
<td>549</td>
<td>752</td>
<td>987</td>
<td>621.3***</td>
</tr>
<tr>
<td>Lack of strength</td>
<td>242</td>
<td>299</td>
<td>366</td>
<td>54.8***</td>
</tr>
<tr>
<td>Frequent headaches</td>
<td>151</td>
<td>172</td>
<td>195</td>
<td>12.0**</td>
</tr>
<tr>
<td>Myositis</td>
<td>146</td>
<td>162</td>
<td>190</td>
<td>10.6**</td>
</tr>
<tr>
<td>Pain in the back/shoulders</td>
<td>144</td>
<td>166</td>
<td>217</td>
<td>28.5***</td>
</tr>
<tr>
<td>Colds/fevers</td>
<td>120</td>
<td>110</td>
<td>131</td>
<td>4.3</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>115</td>
<td>129</td>
<td>154</td>
<td>11.0**</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>105</td>
<td>126</td>
<td>139</td>
<td>11.1**</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>102</td>
<td>135</td>
<td>165</td>
<td>33.7***</td>
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<tr>
<td>Hypertension</td>
<td>95</td>
<td>113</td>
<td>154</td>
<td>29.0***</td>
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<tr>
<td>Colon spasms</td>
<td>72</td>
<td>77</td>
<td>79</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Note: major loadings for each item are bolded.

**p ≤ 0.01, *p ≤ 0.05. **p ≤ 0.001.
the second and third time points and even decreased for women and the 31–40 and 51–60 age groups. Downsizing and workload did not affect the average number of physical health symptoms reported by participants like they did the average number of mental health symptoms reported (see Table 4).

Participants used words like tiredness, feebleness, exhaustion, headaches and shoulder and neck pain to describe their lack of well-being in the wake of the economic collapse. The participants argued that many of their colleagues just could not cope with the situation that had developed in their workplaces since the economic collapse and that the situation was getting worse from year to year. They also mentioned that sickness and sickness-related absences had increased significantly. One primary school teacher put it this way: ‘People feel very badly and this distress appears in physical illness. Sickness absences among employees have increased a lot after the collapse and too many employees simply do not manage to go to work’.

A repeated-measures ANOVA was conducted to explore the impact of gender, age, downsizing and workload on physical and mental health symptoms over time. A Mauchly’s test indicated that the assumption of sphericity had been violated and workload on physical and mental health symptoms over time. A Mauchly’s test indicated that the assumption of sphericity had been violated and that the situation was getting worse from year to year. They also mentioned that sickness and sickness-related absences had increased significantly. One primary school teacher put it this way: ‘People feel very badly and this distress appears in physical illness. Sickness absences among employees have increased a lot after the collapse and too many employees simply do not manage to go to work’.

A repeated-measures ANOVA was conducted to explore the impact of gender, age, downsizing and workload on physical and mental health symptoms over time. A Mauchly’s test indicated that the assumption of sphericity had been violated (physical symptoms: $\chi^2(2) = 93.6; p = 0.001$; mental symptoms: $\chi^2(2) = 1140.9; p = 0.001$); therefore, Greenhouse–Geisser corrected tests are reported (physical health symptoms: $\epsilon = 0.92$; mental health symptoms: $\epsilon = 0.72$). The number of mental health symptoms of participants increased over time, controlling for other factors in the model, $F(1.4, 3252) = 19.74, p < 0.05$, but there was not a significant increase in the number of physical health symptoms, $F(1.8, 3252) = 0.013, p = 0.980$.

The model showed a significant main effect of downsizing vis-à-vis mental health symptoms, $F(1, 2269) = 235.4, p < 0.05$, indicating that mental health symptoms interfere to a greater extent in the daily lives of participants in downsized workplaces than in workplaces where no downsizing occurred. Furthermore, the increase in mental health symptoms was greater in downsized workplaces than in workplaces with no downsizing over time ($F(2, 4538) = 7.49, p < 0.05$). Gender did not make a statistical contribution to the model, either as a main effect ($F(1, 2269) = 0.01, p = 0.924, r = 0.013$) or as an interaction between gender and time ($F(2, 4538) = 0.107, p = 0.831$), gender and downsizing ($F(1, 2269) = 0.008, p = 0.156$) or gender, time and downsizing ($F(2, 4538) = 0.24, p = 0.712$). This indicates that mental health symptoms were similar for both men and women over time both in workplaces that had undergone downsizing and those that had not. However, it was observed that mental health symptoms interfered to a greater extent in the daily lives of younger participants than in the lives of older

### Table 4

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<tbody>
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<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
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<tr>
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<tr>
<td>Male</td>
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<td>2.67 (1.2)</td>
<td>2.79 (1.2)</td>
<td>2.73 (1.8)</td>
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<td>Female</td>
<td>2.57 (1.2)</td>
<td>2.70 (1.2)</td>
<td>2.80 (1.2)</td>
<td>2.59 (1.8)</td>
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<tr>
<td>Age (years):</td>
<td></td>
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<td></td>
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<tr>
<td>&lt;30</td>
<td>2.65 (1.2)</td>
<td>2.90 (1.1)</td>
<td>2.96 (1.1)</td>
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<td>2.39 (1.7)</td>
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<td>&gt;60</td>
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<td>2.63 (1.2)</td>
<td>2.71 (1.2)</td>
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</tr>
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<td>Yes</td>
<td>2.69 (1.2)</td>
<td>2.92 (1.3)</td>
<td>3.09 (1.1)</td>
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<td>No</td>
<td>2.13 (1.2)</td>
<td>2.14 (1.2)</td>
<td>2.22 (1.2)</td>
<td>2.49 (1.8)</td>
</tr>
<tr>
<td><strong>Workload</strong>:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>2.12 (1.2)</td>
<td>2.31 (1.2)</td>
<td>2.39 (1.2)</td>
<td>2.91 (1.9)</td>
</tr>
<tr>
<td>Heavy</td>
<td>2.60 (1.2)</td>
<td>2.75 (1.2)</td>
<td>2.85 (1.2)</td>
<td>2.58 (1.8)</td>
</tr>
</tbody>
</table>

*Differences between downsized place and not: mental symptoms: 2010: $t_9(1071) = 6.78; p < 0.001$; 2011: $t_9(660) = 11.19; p < 0.001$; 2013: $t_9(77) = 14.44; p < 0.001$. **Differences between light and heavy workload: mental symptoms: 2010: $t_9(1070) = 4.15; p < 0.001$; 2011: $t_9(1296) = 4.15; p < 0.001$; 2013: $t_9(217) = 4.90; p < 0.001$.**
participants \((F(1, 2269) = 5.42, p < 0.05, r = 0.049)\) and increased more for the younger participants over time \((F(2, 4538) = 3.701, p < 0.05)\). The results also revealed that mental health symptoms were worse in workplaces with heavy workloads than in those with light workloads \((F(1, 2269) = 46.67, p < 0.05, r = 0.14)\) and that increased workloads between the first study and follow-up study 2 led to worsened mental health symptoms over time among participants in workplaces with heavy workloads but not to the same extent among participants in workplaces with light workloads \((F(1, 2269) = 5.06, p < 0.05)\).

Like mental health symptoms, physical health symptoms interfered to a greater extent in the daily lives of participants in downsized workplaces than in the daily lives of participants in workplaces where no downsizing occurred \((F(1, 2269) = 5.2, p < 0.05)\). However, there was neither a significant increase in physical health symptoms over time for participants in downsized workplaces nor workplaces with no downsizing \((F(2, 4538) = 0.544, p = 0.567)\) (see Fig. 1). No differences were observed for physical health symptoms by gender \((F(1, 2269) = 0.42, p = 0.520, r = 0.002)\) or age \((F(1, 2269) = 0.10, p = 0.756, r = 0.018)\). However, the results revealed a significant effect of workloads on physical health symptoms \((F(1, 2269) = 34.07, p < 0.05, r = 0.012)\), indicating that in workplaces with heavy workloads physical health symptoms were more common and the greater the workloads the higher the number of physical health symptoms over time \((F(2, 4538) = 4.875, p < 0.05)\). Furthermore, increased workloads between the first study and follow-up study 2 led to a higher number of physical health symptoms \((F(1, 2269) = 20.02, p < 0.05, r = 0.093)\) among participants, and increased workloads over time also affected the physical health symptoms of participants \((F(1, 2269) = 22.60, p < 0.05)\).

The focus groups support these results. For example, it was observed that many participants, especially those in downsized workplaces, talked about increased workload and stress since the economic crisis. In their opinion, the workplace had increased the psychological pressure on the employees, in addition to the personal strain, especially in downsized workplaces. In addition, the worsening situation of their ‘clients’ also affected their own job negatively. This secondary school teacher describes how worries about her students negatively impacted her sleep in the wake of the economic crisis:

You lie in bed, going to sleep and then all of a sudden you start thinking about your students and their circumstances. You feel bad and try to find out ways you can use to help them. But you feel helpless and the anxiety takes over your mind. You go through the whole night without getting any sleep at all and then you are tired the whole day after. Sometimes it goes on like this for several nights and you simply are exhausted.

![Graph showing changes in physical and mental health symptoms over time in workplaces that had undergone downsizing and workplaces that had not.](image)

**Fig. 1.** Changes in physical and mental health symptoms over time in workplaces that had undergone downsizing and workplaces that had not. **Note:** covariates appearing in the model are evaluated at the following values: Age = 48.14, workload = 6.10 and changes in workload = –0.41.
Changes in the working environment not only affect employees mentally but are also reflected in physical health symptoms, according to the participants in the focus groups. They generally agreed that physical health was much poorer after the economic recession than before it in both downsized workplaces and workplaces with no downsizing, although they assumed that the situation was worse in downsized workplaces. The participants agreed that increased workloads and feelings of stress were two of the reasons for poorer physical health, especially in downsized workplaces. Some participants also pointed out that prior to the economic recession the workplace was a very good and fun place to work, but now employees are just physically and mentally exhausted at the end of the workday and that this applied to most employees.

4. Discussion

Based on balanced panel data and focus groups, this article explores the relationship between time and self-reported mental and physical health and health symptoms among remaining employees two, three, and five years after the economic collapse in Iceland. We ask: (1) Did self-reported mental and/or physical health of employees deteriorate since the economic collapse in October 2008? (2) What are the effects of gender, age, downsizing and workload on self-reported mental and physical health of employees over time? (3) Which mental and physical symptoms were the most common and showed the biggest changes over time?

Interestingly, the quantitative results show that both self-reported mental and physical health deteriorated significantly between the time points of the study, both in workplaces that had undergone downsizing and in those that had not. However, in line with Snorradóttir’s et al. study on the Icelandic bank employees (15, 20), health worsened most in downsized workplaces and in those with heavy workloads. The participants in the focus groups confirmed these findings, by drawing a picture of employees who were increasingly physically and mentally exhausted, due to increased anger, insecurity and workloads during the recession.

Our results did not reveal any differences in self-reported mental or physical health by gender, age or occupations, which indicate that both self-reported mental and physical health declined similarly over time regardless of these background variables. Before we point out that research results on gender differences in health following economic downturns are conflicting. Our results are not in agreement with Snorradóttir et al. [15] who found that more female than male employees of the fallen Icelandic banks were psychologically distressed. However, the different outcomes could be explained by the fact that the scales used in the studies were not comparable; a well know problem when comparing the outcomes of different studies. The fact that our results did not reveal any differences in self-reported mental or physical health by gender or occupations are on the other hand consistent with the findings of Kondo et al. [17] who studied occupational health after the economic crisis in Japan in the 1990s.

We further asked about 14 health symptoms; if they had interfered with daily lives of participants, which symptoms were the most common and which showed the biggest changes over time. The most common symptom reported was sadness and the biggest change over time was in extreme worry, but other mental symptoms such as anxiety and sleep disturbances also increased over time. These results are in line with the discussions in the focus groups and confirm, like other international studies (10, 11, 12, 13) increased mental health problems following economic recession.

McDaid et al. [9] argued that available data are likely to underestimate broad mental health consequences related to the latest economic recession. Our results add to that knowledge, showing that the recession in Iceland had strong negative consequences for the studied employees’ mental health. What is more, our results complement the existing knowledge we have about physical health, which has been much less studied in relation to economic downturn than mental health. We show that eight of ten physical symptoms (lack of strength, frequent headaches, myositis, pain in the back/shoulders, abdominal pain, dyspnea, arrhythmias and hypertension) increased statistically over time, only cold/fevers and colon spasms did not. The few studies we have found about the issue are in line with our results, showing worsening of symptoms like arrhythmia, back pain, headaches [16] and hypertension in connection with economic recession [29]. These results show the importance of looking holistically at occupational health.

As mentioned before, results on the connection between gender and health following economic recession have been diverse. When a repeated-measures ANOVA was conducted to explore whether changes in the reported number of mental and
physical health symptoms depended on gender, age, downsizing, workload and changes in workload the study did not reveal any gender differences, neither for mental nor physical health symptoms over time. However, it revealed age differences for mental symptoms where mental symptoms interfered to a greater extent in the daily lives of younger participants than the older ones. Our study also revealed that heavy workload was strongly associated with both mental and physical symptoms, and downsizing, but only with mental symptoms. Participants in the focus groups shed a further light on this, by explaining in words their actual experience and lack of well-being.

The strength of this study is the triangulation of the data; focus group interviews and panel data covering about 50% of those employed by municipalities in Iceland, where the same individuals are followed, two, three, and five years after the bank collapse in 2008. It is also strength that we are not working with sample case study, as the questionnaires were sent to all employees within the frame of the study. The response rate is very acceptable. The panel data allows us to make conclusions about changes in health and well-being over time, while the interviews allow the employees to describe in their own words their feelings and reflections, which strengthens our understanding of the phenomena. It may sound confusing that we differ between health in general and health symptoms. However, the results are based on different questions and we see the separation of general health and the symptoms as important step into deeper understanding of the connection between health and the recession.

It can be seen as a weakness that the first time point of the quantitative data was over a year after the collapse of the banks. Nevertheless, the reflections in the interviews when the employees compare the situation before and after the crisis partly compensate for that. However, it is important to underline that our results do not give any indications of causal relationships between the bank collapse and the changes in the occupational mental and physical health and should not be interpreted in such a fashion. One reason is that we do not have comparable data prior to the bank collapse. Also, it is possible that the discourse after the bank collapse encouraged open discussion about psychosocial distress beyond what was previously allowed. It is also important to underline that even if the employees claim that workload and psychosocial strain has increased, as well as the sickness absences, we don’t know if it was mainly caused by the situation at the workplace, or if it was due to a spread effect from the employees and their clients’ families. As mentioned above, some employees experienced increased personal strain in the wake of the crisis, partly because of increased financial problems within their families, but also because the clients and their families were more difficult to deal with.

Finally, questions on self-reported health, but not necessarily health that has been analysed and confirmed by a physical doctor, have certain limitations regarding the validity and reliability of measurements due to differences in response behaviour and recall bias [19]. Nevertheless, self-reported health has proven to be successful as a predictor of individuals’ future health, and can be early warning signals of future sick leave [37].

5. Conclusion

The originality of the study is that it shows that not only did the mental and physical health of the employees deteriorate after the economic collapse, but also that the health steadily decreased two, three and five years after the bank collapse. That is, the poor mental and physical symptoms observed have progressively increased since the collapse. What is also of importance is that even if this is a general trend, workplaces where downsizing occurred and workplaces with heavy workloads were the hardest hit. This demonstrates the importance of refining the understanding of what happens within work organizations in the wake of a deep economic downturn, not only in the direct aftermath of the crisis, but even five years later. We hope that our results have both theoretical and practical consequences, by encouraging further studies in the field and by motivating those who work with workplace health promotion, prevention and rehabilitation to take these results into account.

Conflict of interest

The authors have no conflict of interest to report.

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