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## Economic recession and health inequalities in Japan: analysis with a national sample, 1986–2001

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### Abstract

**Objective**—Little is known about whether economic crises widen health inequalities. Japan experienced more than 10 years of economic recession beginning in the 1990s. The question of whether socioeconomic-based inequality in self-rated health widened after the economic crisis was examined.

**Design, setting and participants**—Repeated cross-sectional survey design. Two pooled datasets from 1986 and 1989 and from 1998 and 2001 were analysed separately, and temporal change was examined. The study took place in Japan among the working-age population (20–60 years old). The two surveys consisted of 168 801 and 150 016 people, respectively, with about an 80% response rate.

**Results**—The absolute percentages of people reporting poor health declined across all socioeconomic statuses following the crisis. However, after controlling for confounding factors, the odds ratio (OR) for poor self-rated health (95% confidence intervals) among middle-class non-manual workers (clerical/sales/service workers) compared with the highest class workers (managers/administrators) was 1.02 (0.92 to 1.14) before the crisis but increased to 1.14 (1.02 to 1.29) after the crisis ( $p$  for temporal change = 0.02). The association was stronger among males. The adjusted ORs among professional workers and young female homemakers also marginally increased over time. Unemployed people were twice as likely to report poor health compared with the highest class workers throughout the period. Self-rated health of people with middle to higher incomes deteriorated in relative terms following the crisis compared with that of lower income people.

**Conclusions**—Self-rated health improved in absolute terms for all occupational groups even after the economic recession. However, the relative disparity increased between the top and middle occupational groups in men.

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Japan has been a focus of frequent attention because of its achievement in population health as well as its egalitarian social security system including universal healthcare coverage and mandatory pension system since the 1960s.<sup>1,2</sup> However, the country currently has serious concerns about rising inequality. In the early 1990s, Japan experienced an economic crisis, the so-called collapse of the bubble economy, which was followed by more than a decade of

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economic recession. Economists argue that this recession is linked to Japan's recent increase in socioeconomic inequality.<sup>3</sup> In 1998, Japan's economy encountered the first negative growth since World War II. In the same year, the rate of suicide rose sharply (age-adjusted suicide mortality per 100 000 population rose from 18.8 in 1997 to 25.2 in 1998) and has remained at record high levels since. This suicide “epidemic” has been specifically shown in working-age males (fig 1).<sup>4</sup> It is believed that the epidemic is due to rapid changes in industrial structure and working environments following the economic recession.<sup>5 6</sup> These rapid changes may also have adversely affected working-age males' lifestyle. A national survey reported that the prevalence of coronary risk factors has risen in this population during the recession.<sup>7–9</sup>

The 1997–8 Asian financial crisis led to a dramatic increase in suicide deaths among Korean males aged 35–64 years and widened education-based health inequalities, whereas transport accident deaths decreased because of reduced traffic as a result of skyrocketing oil prices.<sup>10 11</sup> The crisis also affected other Asian countries.<sup>12</sup> Similar studies have also been conducted in Europe.<sup>13 14</sup> Studies in Britain and in Spain suggest an adverse impact of economic crises on health inequalities, but a study in Finland (which has stronger safety nets) reported rather smaller health disparities following a crisis.<sup>15</sup>

In Japan, an ecological study indicated that inequalities in mortality narrowed until 1995 but widened thereafter, coinciding with the economic crisis.<sup>16</sup> However, convincing evidence based on individual-level analysis is still lacking.

We hypothesised that Japan's socioeconomic disparity in health widened after the economic recession, and that working-age males—the main target of corporate restructuring within a sluggish economy—were especially vulnerable to ill-health due to the crisis. In this study, we examine these hypotheses by comparing the cross-sectional association of perceived health with occupation or income within two datasets before and after the economic crisis.

## METHODS

### Data source

Data on perceived health status, occupation, income and demographic factors were derived from the 1986, 1989, 1998 and 2001 Comprehensive Survey of the Living Conditions of People on Health and Welfare (CSLC) conducted by the Ministry of Health, Labour, and Welfare. This survey interviewed all household members within census tracts that were randomly selected from all prefectures in the nation. For example, the 2001 survey was conducted across 5240 census tracts including 247 278 households (response rate of 87.4%), of which 31 871 households were randomly selected and surveyed regarding income and savings (response rate of 79.5%).

To increase statistical power, we pooled data from 1986 and 1989 for analysis, as well as data from 1998 and 2001. The two periods are distinct in terms of economic growth, corresponding to the periods before and after the economic recession (fig 1). Because we focused on the working-age population, individuals aged between 20 and 60 years were used. Thus, a total of 168 801 and 150 016 respondents who completed the income and savings survey in the 1998/2001 and 1986/1989 data, respectively, were used for analysis.

### Measurements

The CSLC elicited respondents' perceived health with the single item: “What is your current health status: excellent, very good, good, fair, or poor?” From this question, we created a dichotomous outcome measure with poor perceived health if the respondent answered fair or poor.

We used occupation and income as socioeconomic status (SES) measures. Following recent studies, we categorised a broad range of 14 occupations, compatible with the classification by ISCO-88,<sup>17</sup> as follows: (1) managerial or administrative workers; (2) professional workers, including professional and technical workers; (3) middle-class non-manual workers, including clerical, sales and service workers; (4) manual workers, including labourers, security officers and traffic, agricultural, forestry or fishery workers; and (5) other paid workers. We also considered economically inactive persons: (6) homemakers and (7) the unemployed.<sup>18 19</sup> Annual household income before tax including benefits and inheritances adjusted for household size (equivalence elasticity = 0.5) was used. To maintain comparability with other studies, we divided the subjects equally into deciles of income in each survey.<sup>20–23</sup>

Demographic variables included age, gender and marital status. Marital status was categorised as married, never married, separated or divorced. We did not include behavioural risk factors such as smoking, alcohol drinking, exercise habits and health check-ups when modelling the association between SES and perceived health in order not to overadjust because we considered these variables as potential mediating variables.<sup>24</sup>

### Statistical analysis

First, we calculated the absolute percentages of people reporting poor health according to SES, adjusted for sociodemographic factors. We then estimated the odds ratio (OR) and its 95% confidence intervals (CI) of reporting poor health among occupational classes using the highest class occupation as reference. To address the potential clustering of the data arising from the stratified sampling strategy, we used a multivariate generalised estimating equation with a logit link function (PROC GENMOD, the SAS statistical package version 9.1, SAS Institute Inc, Cary, NC, USA). Census tracts were selected as cluster units (up to 392 people per cluster). Next, we created models separately for pooled data in 1986/1989 and 1998/2001. Interaction analysis tested whether the SES–health association changed significantly over time. Finally, we stratified the sample by gender as well as two age groups of 20–39 years and 40–60 years.<sup>18 20</sup> In addition, the relative index of inequality (RII) for poor health was calculated across income deciles. The RII can be interpreted as the relative rate of reporting poor health for the hypothetically poorest compared with the hypothetically richest person in the population, assuming a linear association between income and self-rated health.<sup>25</sup> All p values are two-tailed.

## RESULTS

Descriptive data showed that more women reported poor health than men (11.4% vs. 9.4% in 1986/1989 and 10.9% vs. 8.9% in 1998/2001), as did the 40- to 60-year-old age group compared with the 20- to 39-year-old group (13.0% vs. 7.6% and 11.5% vs. 7.9%). There were no male homemakers in 1986/1989 and only 63 in 1998/2001. The prevalence of poor perceived health varied by marital status (range 7.2% to 17.3%). In the 1986/1989 data, 10.4% reported fair or poor health, which dropped to 9.9% in the 1998/2001 data (table 1).

### Occupation

After the crisis, the absolute percentages of people reporting poor health adjusted for sociodemographic factors declined across all SES categories. The reductions were largest among the unemployed (–21.2%) followed by managers or administrators (–18.8%) (fig 2).

Multivariate analysis showed no statistically significant associations between occupational status and self-rated health among economically active people before the economic crisis. However, after the crisis, middle-class non-manual workers (ie clerical, service and sales workers) were significantly more likely to report poor health: adjusted OR (95% CI) of

reporting poor health compared with the highest class workers (ie managerial and administrative workers) increased from 1.02 (0.92 to 1.14) to 1.14 (1.02 to 1.29) (p for temporal change = 0.02). The adjusted ORs among professionals and homemakers increased marginally from 1.09 to 1.19 (p for temporal change = 0.08) and from 1.31 to 1.42 (p for temporal change = 0.10) respectively. The adjusted ORs were highest among professionals, followed by middle-class non-manual and manual workers. Unemployed people showed significantly higher ORs throughout the period: the adjusted ORs for this population were more than double (table 2).

Gender-stratified analysis demonstrated that the association between occupation and perceived health among middle-class non-manual workers was statistically significant only in males, and it increased significantly over time: the adjusted OR of poor health among male middle-class workers compared with the highest class workers changed from 1.00 to 1.16 (p for temporal change = 0.04). There was a marginal increase in the adjusted OR among female professionals (from 0.98 to 1.27, p for temporal change = 0.10). When stratified by age group (ie, 20–39 and 40–60 years old), analysis found only marginal increase in the adjusted ORs through the economic crisis among younger age professionals, homemakers and the unemployed (p for temporal change = 0.09 for all the groups) (table 3).

## Income

The adjusted proportion of people reporting poor health ranged from 12.5% to 17.2% in the 1986/1989 dataset, with higher incomes associated with better self-rated health. The proportion decreased in the later years throughout income deciles, and the lower six deciles had larger decreases (–19.8% to –13.7%) compared with the higher deciles (–12.6% to –11.6%) except for the highest decile (–14.8%) (fig 2).

Despite our hypothesis, multivariate models indicated a marginal decline in the income gradient in self-rated health following the crisis (p for temporal change in income trend = 0.06) (table 2), while changes in RII from 1.34 to 1.27 over time were not statistically significant (p for temporal change = 0.20).

Males showed a slightly steeper income gradient in self-rated health. When models were separated by age group, the income gradient became significantly shallower after the crisis among the older age group: p values for temporal change in the income–health trend and the income RII in poor health were 0.01 and 0.05 respectively. However, the RII marginally increased among the younger age group (p for temporal change = 0.10) (table 3).

## DISCUSSION

We found that, following the economic crisis in Japan, although absolute health status improved among all the SES categories, when relative disparities were examined, non-manual classes of workers were more likely to report poor health compared with the highest class workers (administrators or managers). These changes were pronounced among males. The likelihood of reporting poor health among unemployed people was twice as high as in the highest class workers irrespective of the crisis. However, we obtained only partial support for our hypothesis with regard to the effect of the economic crisis on the income–health gradient among younger working-age people. In contrast, the income–health gradient was shallower following the crisis among the older working-age people.

The improvement in absolute health status among all SES categories is consistent with Japan's vital statistics showing largely improved mortality and morbidity in the nation. For example, the reduction in cardiovascular mortality between 1985 and 2000 was by 45% in men and by 52% in women.<sup>4</sup> The result is also consistent with studies in other countries showing overall improvement in population health despite the impact of the economic crisis.<sup>10 15</sup>

While overall absolute health status improved over time, we found that occupational disparities in health between the highest class and middle-class males widened after the crisis, which supports our hypothesis. Studies in other countries agree with this finding.<sup>11 13 14</sup> For example, Mitchell and colleagues<sup>26</sup> reported that the geographical mortality gap across socioeconomic positions in Britain widened following the economic crisis in the 1980s. Previous studies suggest that the adverse effects of economic crises tend to be concentrated among lower SES groups. In contrast to those findings, the results of our study suggest that the deleterious health impact of the economic crisis in Japan has been felt more among white-collar workers (at least in relative terms). This unique pattern is consistent with some Japanese studies, showing that in Japan manual workers do not necessarily have poorer health compared with a higher employment grade.<sup>18 27–29</sup> Our study is also consistent with the trend in recent suicide statistics and increased prevalence of coronary risk factors among working-age males.<sup>7–9</sup> Vital statistics indicate that the current suicide epidemic has been particularly prevalent among working-age males.<sup>4 30</sup> Police reported that 47% of those who killed themselves were unemployed.<sup>6</sup> A Japanese large cohort study (n = 15 597) found that perceived health strongly predicted the future incidence of suicide.<sup>31</sup> Corporate downsizing not only creates unemployment but also increases job demand among the remaining employees. White-collar workers' employment position, which was previously guaranteed by their companies, became insecure due to the end of lifetime job security and the collapse of the traditional seniority-based promotion system.<sup>32</sup>

The relative health status of young female homemakers worsened marginally after the recession. This may be attributable to reduced living standards, marital friction or multiple role occupancy stemming from their laid-off partners or their partners' deteriorated working conditions.<sup>32–34</sup>

Contrary to our hypothesis, the income–health gradient became shallower over time at least among older working-age people, which may be due to the smaller improvement in absolute health (or relatively deteriorated health) among middle or higher income compared with lower income people (fig 2). A study in Finland similarly reported a reduction in income disparities in health following an economic crisis.<sup>15</sup> The narrowing income–health gradient over time is in agreement with the relative worsening of health among middle or higher class occupations, together suggesting that Japan's economic crisis mainly affected middle or higher SES groups rather than the lower or the highest SES groups. Another potential explanation for the reduced income–health gradient is that formal social supports for the most economically deprived population might be improved.<sup>15</sup> However, we were not able to find convincing evidence supporting this. Indeed, the number of households receiving social security benefits increased by 1.2 times from 1990 to 2001, but this fact can be rather considered as the result of increased inequality.<sup>35</sup>

In younger working-age people, health disparities between the unemployed, homemakers and managers/administrators as well as the overall income–health gradient appeared to increase after the crisis. Because younger people generally have lower wages, they may be more vulnerable to ill-health due to income inequality or economically inactive status.

This study has several strengths. Our national probability sample supports the generalisability of this study. We used comparable surveys across multiple time points, taking advantage of the “natural experiment” caused by the economic recession. On the other hand, some limitations should be noted. First, because of the cross-sectional rather than panel design, we could not tease out reverse causation, ie ill-health resulting in downward occupational mobility. Second, our data was lacking in individual-level information on job insecurity, work overload or pay cuts, so that we could not find how workers were affected by the recession. Third, our outcome was self-reported. However, self-rated health has been shown to be a strong predictor of mortality and other objective health indicators.<sup>31 36 37</sup> Finally, despite the large sample size,

the statistical significance of the temporal differences before and after the crisis was not sufficient to confirm the gap. This might be attributed to the study design, ie data in 1986 and 1989 may not have been the best choice for the comparison group against the post-crisis period. We also have to evaluate the time trend using a stronger design such as an individual-level panel study.

In sum, the present study provides important evidence that, despite the improved absolute health status throughout all social classes, in relative comparison, self-rated health among middle-class male workers might deteriorate following the economic recession, along with that of their spouses at home. Although this post-recession SES–health pattern is not concordant with that reported from other countries, our results are supported by the recent suicide epidemic and rising coronary risk profile among male Japanese workers.<sup>6 16 30 38 39</sup> The persistent poor relative health status among unemployed people is also of concern. Although our findings on the effect of economic recession on health disparities warrant further confirmation, our study revealed clear health disparities by SES in Japan, as well as an adverse impact of the economic recession on relative SES disparities in health. A recent international ecological comparative study indicated a much shallower association between income and mortality in Japan compared with Britain around 1990.<sup>40</sup> Our results suggest that it may be time to re-examine the impact of the decade-long economic recession on the health of the Japanese. Moreover, policies need to pay greater attention to SES as a social determinant of health in Japan, as well as to working conditions, which seem to have deteriorated particularly for white-collar workers during the post-recession period.<sup>16 41</sup>

#### What this study adds

- ▶ The impact of economic recession on population health is debated. Some ecological studies suggest lower mortality rates during recession. Few individual-level studies have been reported.
- ▶ Japan underwent a prolonged economic recession in the 1990s. Using individual-level data, we find that self-rated health improved throughout the period for Japanese men and women. However, occupational class-based inequalities in poor health widened during the same period. Middle-class male workers and female homemakers were particularly adversely affected by the crisis, compared with the highest class workers, while unemployed people had persistently poor health throughout the period.

#### Policy implication

Policies need to pay greater attention to SES as a social determinant of health in Japan, as well as to working conditions, which seem to have deteriorated particularly for white-collar workers during the post-recession period.

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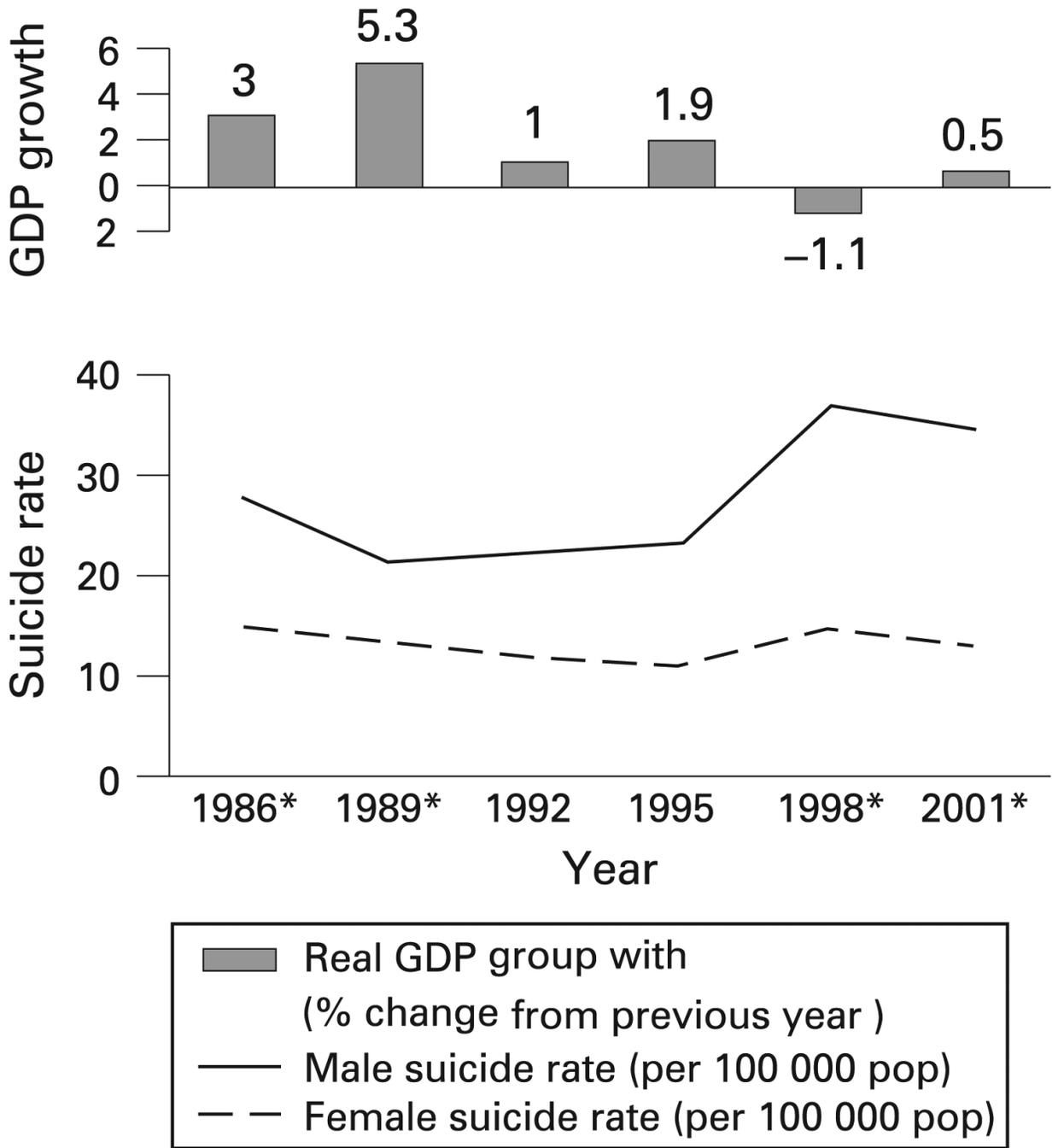
NK conceived the study, completed the analysis and wrote the draft. SVS assisted with statistical analysis and conceptualised ideas. IK supervised the study and helped to conceptualise ideas. YT and ZY contributed to data collection and project management. We gratefully appreciate the valuable comments of Michael Reich, Marc Mitchell and all fellows and scholars in the 2006–07 HSPH Takemi programme in international health.

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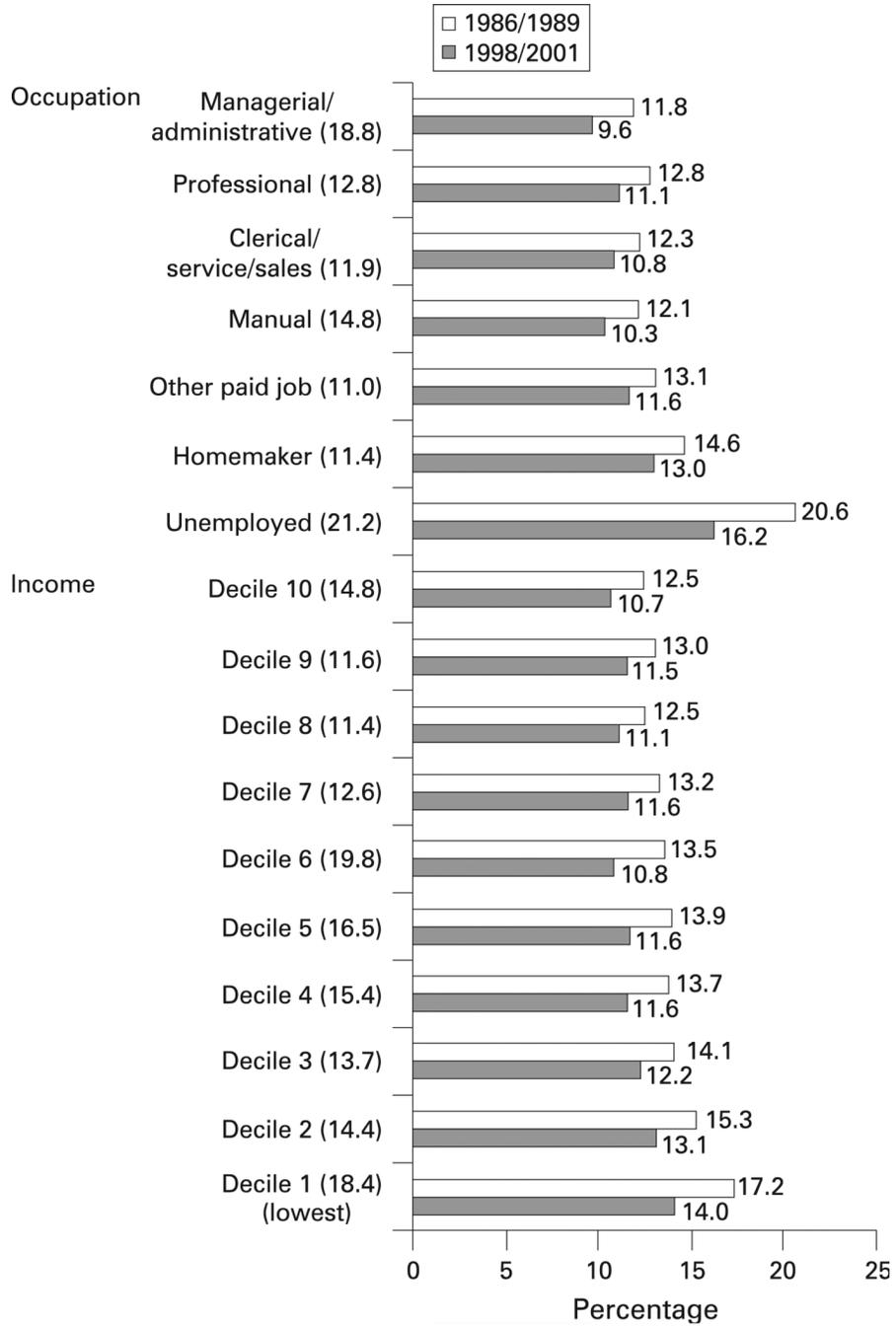
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**Figure 1.** Economic growth and suicide ratio for 1986–2001. \*The years of data used in this study. Japan's economic recession began in the early 1990s and, in 1998, the country experienced the first negative growth after World War II when the male suicide rate increased sharply (a 40% increase over the previous year).



**Figure 2.** Adjusted percentages in reporting fair or poor health by socioeconomic position before (1986/1989) and after (1998/2001) the economic crisis and its percentage reduction (in parenthesis); CSLC, Japan. Percentages are adjusted for age, gender, marital status, survey year and either income or occupation.

Characteristics of the subjects in pooled data from 1986/1989 and 1998/2001; CSLC, Japan

Variable	1986/1989		1998/2001		Fair/poor health (%)	Number (%)	Fair/poor health (%)
	Number (%)	Fair/poor health (%)	Number (%)	Fair/poor health (%)			
Age (years)							
20–39	80 966 (48.0)	7.6	68 072 (45.4)	7.9			
40–60	87 835 (52.0)	13.0	81 944 (54.6)	11.5			
Gender							
Male	82 612 (48.9)	9.4	74 033 (49.4)	8.9			
Female	86 189 (51.1)	11.4	75 983 (50.7)	10.9			
Marital status							
Married	127 447 (75.5)	10.8	100 855 (67.2)	10.4			
Never married	33 696 (20.0)	7.2	41 153 (27.4)	7.9			
Separated	3683 (2.2)	16.8	2551 (1.7)	12.8			
Divorced	3963 (2.4)	17.3	5439 (3.6)	14.7			
Occupation							
Managerial/administrative	5601 (3.4)	9.4	7097 (5.0)	8.6			
Professional	14 874 (9.0)	9.0	21 150 (14.8)	9.0			
Clerical/sales/service	51 145 (30.9)	8.9	45 261 (31.6)	9.2			
Manual	47 458 (28.7)	9.8	32 022 (22.3)	8.8			
Other paid job	1733 (1.1)	11.5	2358 (1.6)	10.2			
Homemaker	34 565 (20.9)	12.5	24 292 (16.9)	12.3			
Unemployed	10 267 (6.2)	16.5	11 189 (7.8)	12.6			
Household income* (median in each year, 10 000 yen)							
Decile 1 (lowest)	87.7	14.5	116.0	99.3			
Decile 2	134.4	11.9	196.3	173.1			
Decile 3	171.0	10.5	250.4	227.5			
Decile 4	202.1	9.9	300.0	276.0			
Decile 5	234.3	10.1	352.2	325.0			
Decile 6	268.3	9.8	404.5	375.3			
Decile 7	305.5	9.6	466.5	434.7			
Decile 8	355.5	9.0	546.2	507.5			
Decile 9	431.5	9.6	658.0	612.0			
Decile 10	431.5	9.4	911.0	851.4			
Self-rated health							
Excellent/very good/good	148 295 (89.6)		128 024 (90.1)				
Fair/poor	17 199 (10.4)		14 062 (9.9)				

\* Adjusted for household size with equivalence elasticity = 0.5.

**Table 2**

Crude and adjusted ORs (95% CIs) for reporting poor health and relative index of inequality (RII) in income before\* and after\* the economic recession; CSLC, Japan

	Before	After	p for temporal change
Occupation			
Managerial/administrative	1.00	1.00	
Professional	1.09 (0.96 to 1.23)	1.19 (1.05 to 1.35)	0.08
Clerical/sales/service	1.02 (0.92 to 1.14)	1.14 (1.02 to 1.29)	0.02
Manual	1.03 (0.92 to 1.14)	1.09 (0.97 to 1.22)	0.25
Other paid job	1.14 (0.92 to 1.43)	1.26 (1.03 to 1.54)	0.28
Homemaker	1.31 (1.17 to 1.47)	1.42 (1.25 to 1.61)	0.10
Unemployed	2.30 (2.04 to 2.61)	2.06 (1.79 to 2.37)	0.80
Income			
Lowest/highest decile	1.60 (1.47 to 1.74)	1.43 (1.29 to 1.60)	
p trend	<0.001	<0.001	0.06
RII	1.34 (1.28 to 1.41)	1.27 (1.19 to 1.36)	0.20
Age: 40–60/20–39 years	1.75 (1.68 to 1.83)	1.50 (1.42 to 1.59)	
Gender: female/male	1.11 (1.06 to 1.16)	1.15 (1.09 to 1.21)	
Marital status			
Married	1.00	1.00	
Never married	0.73 (0.68 to 0.78)	0.84 (0.78 to 0.90)	
Separated	1.18 (1.06 to 1.31)	1.05 (0.90 to 1.23)	
Divorced	1.40 (1.27 to 1.56)	1.32 (1.19 to 1.48)	
Survey year: 1986 or 1998 <sup>†</sup>	0.94 (0.90 to 0.98)	1.09 (1.04 to 1.15)	

\* Before: pooled data from 1986 and 1989; after: pooled data from 1998 and 2001.

<sup>†</sup> Base: 1989 or 2001 respectively.

Table 3

Adjusted odds ratios (ORs) (95% confidence intervals) for reporting fair or poor health by occupation and relative index of inequality (RII) in income by gender or by age group before\* and after\* the economic recession; CSLC, Japan

	Before	After	p for temporal change	Before	After	p for temporal change
	Male			Female		
Occupation	1.00	1.00		1.00	1.00	
Managerial/administrative	1.08 (0.94 to 1.24)	1.12 (0.97 to 1.28)	0.53	0.98 (0.76 to 1.27)	1.27 (0.94 to 1.71)	0.10
Professional	1.00 (0.89 to 1.13)	1.16 (1.02 to 1.32)	0.04	0.91 (0.71 to 1.16)	1.09 (0.82 to 1.46)	0.23
Clerical/sales/service	1.06 (0.94 to 1.19)	1.12 (0.99 to 1.28)	0.31	0.87 (0.68 to 1.12)	0.99 (0.74 to 1.32)	0.51
Manual	1.16 (0.85 to 1.59)	1.07 (0.81 to 1.43)	0.90	0.99 (0.70 to 1.39)	1.39 (0.98 to 1.98)	0.13
Other paid job	—†	3.94 (1.87 to 8.30)	—†	1.17 (0.92 to 1.49)	1.40 (1.05 to 1.86)	0.28
Homemaker	—†	2.18 (1.85 to 2.58)	0.26	1.62 (1.26 to 2.09)	1.87 (1.37 to 2.54)	0.27
Unemployed	2.87 (2.48 to 3.32)	1.48 (1.28 to 1.73)		1.52 (1.37 to 1.69)	1.39 (1.21 to 1.59)	
Income	1.66 (1.47 to 1.87)	1.48 (1.28 to 1.73)		1.52 (1.37 to 1.69)	1.39 (1.21 to 1.59)	
Lowest/highest decile	<0.001	<0.001	0.22	<0.001	<0.001	0.12
p trend	1.36 (1.27 to 1.47)	1.28 (1.17 to 1.41)	0.32	1.32 (1.23 to 1.41)	1.22 (1.12 to 1.33)	0.68
RII	Age 20–39 years			Age 40–60 years		
Occupation	1.00	1.00		1.00	1.00	
Managerial/administrative	0.85 (0.67 to 1.08)	1.16 (0.85 to 1.59)	0.09	1.11 (0.96 to 1.28)	1.14 (0.99 to 1.32)	0.75
Professional	0.83 (0.66 to 1.05)	1.09 (0.80 to 1.48)	0.11	1.03 (0.91 to 1.17)	1.14 (1.00 to 1.29)	0.24
Clerical/sales/service	0.80 (0.63 to 1.01)	0.99 (0.72 to 1.36)	0.25	1.09 (0.96 to 1.23)	1.12 (0.98 to 1.27)	0.73
Manual	0.90 (0.62 to 1.32)	0.97 (0.63 to 1.50)	0.69	1.19 (0.92 to 1.55)	1.40 (1.11 to 1.76)	0.28
Other paid job	0.83 (0.65 to 1.05)	1.08 (0.79 to 1.48)	0.09	1.56 (1.37 to 1.77)	1.57 (1.37 to 1.81)	0.89
Homemaker	1.24 (0.96 to 1.59)	1.63 (1.17 to 2.25)	0.09	3.19 (2.76 to 3.69)	2.60 (2.20 to 3.08)	0.08
Unemployed						
Income	1.65 (1.41 to 1.93)	1.44 (1.18 to 1.75)		1.53 (1.38 to 1.69)	1.40 (1.23 to 1.58)	
Lowest/highest decile	<0.001	<0.001	0.41	<0.001	<0.001	0.01
p trend	1.25 (1.15 to 1.35)	1.42 (1.24 to 1.63)	0.10	1.32 (1.24 to 1.40)	1.20 (1.11 to 1.29)	0.05
RII						

\* Before: pooled data from 1986 and 1989; after: pooled data from 1998 and 2001.

† The dummy variable was excluded because of no subjects in this category. Models were adjusted for marital status, survey year, either gender or age and either occupation or income.