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by [Kachi Y](#), [Otsuka T](#), [Kawada T](#)

Gender differences exist in the associations between precarious employment and mental health in Japan. Precarious employment increases the risk of incidence of serious psychological distress at a clinical level, but only among middle-aged men. Given the increasing numbers of precarious workers, there is an urgent need to develop more effective policies for reducing health disadvantages caused by precarious employment.

Affiliation: Department of Hygiene and Public Health, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-ku, Tokyo, 113-8602, Japan. kachi@nms.ac.jp

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Precarious employment and the risk of serious psychological distress: a population-based cohort study in Japan

by Yuko Kachi, PhD,¹ Toshiaki Otsuka, MD, PhD,¹ Tomoyuki Kawada, MD, PhD¹

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Objectives This study examines whether precarious employment increases the risk of serious psychological distress (SPD) in a nationally representative cohort of Japanese middle-aged people.

Methods From 2005–2009, we followed 8486 male and 6736 female participants (aged 50–59 years) in the Longitudinal Survey of Middle-aged and Elderly Persons. All individuals were employed and free of SPD, cardiovascular disease, and cancer at baseline. The participants were classified into two groups based on their baseline employment contract: precarious and full-time permanent work. SPD was assessed at each year during the study, using the K6 scale, a self-rated 6-item scale that screens for mood or anxiety disorders. We used discrete-time survival analysis, with a complementary log-log link, to examine the effect of precarious employment on SPD incidence.

Results During a maximum follow-up period of four years, 374 men and 364 women developed SPD. Male precarious employees were more likely to develop SPD than male full-time permanent employees (hazard ratio 1.79, 95% confidence interval 1.28–2.51) in the full model, after adjusting for sociodemographic and occupational factors, cardiovascular disease risk, and K6 scores at baseline. By contrast, no significant association was observed among female employees. However, an analysis stratified by marital status revealed an association similar to that found among men but only among unmarried women.

Conclusions The findings suggest that precarious employment is associated with double the risk of SPD incidence among middle-aged Japanese men and – when stratified by marital status – among unmarried women. This highlights a major gender difference in the association between precarious employment and risk of SPD.

Key terms anxiety; depression; employment contract; gender difference; longitudinal study; mental health; middle-aged worker; temporary work.

The number of workers employed precariously has increased worldwide under the competitive pressures of the increasingly globalized economy. In Japan, precarious employment includes part-time, dispatched, and fixed-term work, and these accounted for 20% and 54% of all paid employment for males and females, respectively, in 2013 (1). Precarious employment involves numerous “bad job” characteristics (2–4), such as low income, job insecurity, lack of job training, and exposure to hazardous working conditions (eg, excessive physical strain, low job control, and more noise and air pollution). These characteristics widen the socioeconomic gradients in health between full-time permanent and precarious workers, thus stimulating public health researchers’ interest in examining the health disadvantages faced by precarious workers.

Previous evidence suggests that precarious employment is bidirectionally associated with mental health. Precarious employment can adversely affect mental health through the above-mentioned bad job characteristics (5); however, poor mental health can be a risk factor for precarious employment as well, because health problems reduce the chances of achieving a good position in the labor market (6). Several (7–12), but not all (13–15), longitudinal studies have shown that experiencing precarious employment is associated with a greater incidence of poor mental health, after controlling for the selection effects of mental health on precarious employment. In other words, these studies adjusted for baseline mental health in the multivariate analyses or excluded participants with poor mental health at baseline.

¹ Department of Hygiene and Public Health, Nippon Medical School, Tokyo, Japan.

Correspondence to: Yuko Kachi, Department of Hygiene and Public Health, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-ku, Tokyo, 113-8602, Japan. [E-mail: kachi@nms.ac.jp]

To date, most longitudinal studies on the effects of precarious employment on mental health have been conducted in Europe (7–9, 11, 13, 14) and North America (10, 12). Importantly, some of these studies relied on data collected over a decade or more (10–14). Although differences in temporal and social context (eg, gender roles, labor policies, and social security policies) might affect the association between precarious employment and poor mental health, comparable Asian longitudinal studies using updated data (15) are scarce. In addition, although most previous studies have focused only on mild-to-moderate mental health problems (7–9, 11, 13, 14), it is important to examine people with clinical levels of mental health problems because of the high rates of work disability in this population (16).

The objectives of this study were to examine the association between precarious employment and the incidence of serious psychological distress (SPD) at a clinical level over four years after controlling for the effects of mental health selection into precarious employment. To accomplish this, we used data collected from 2005–2009 from a nationally representative sample of middle-aged men and women.

Methods

Data source

We used data from the Longitudinal Survey of Middle-aged and Elderly Persons (LSMEP), an ongoing nationally representative cohort study (17) conducted by the Ministry of Health, Labor and Welfare. The primary objective of the LSMEP is to help inform policy development by monitoring household, employment, and health status. The first wave began in November 2005, and the subsequent waves have continued every year since. We obtained permission from the Ministry of Health, Labor, and Welfare to use data from the first through fifth waves of the LSMEP (2005–2009). All waves utilized a self-administered questionnaire survey conducted by mail and included the same questions about employment and psychological distress.

Using a cluster random sampling, the LSMEP targeted a random sample of all men and women aged 50–59 years who lived in 2515 census tracts throughout Japan at the end of 2005. Of the 40 877 eligible participants, 34 240 returned the first wave (baseline) questionnaires (response rate: 83.8%), and these individuals were followed up thereafter. The retention rate through 2009 was 83.9%. Ethics approval for the present study was not required because this was a retrospective analysis of national surveillance data that is free of personally identifiable information.

Study population

We excluded participants who met the following criteria sequentially from baseline data: those who were not paid employees (N=13 876); farming, fishery, or forestry workers (N=156); those with a history or presence of stroke, heart disease, or cancer (N=921); and those with SPD (N=362) or missing data on SPD (N=1168). We also excluded participants with no follow-up survey (N=1137) and missing data on incident SPD (N=1398). Thus, a total of 15 222 employees without SPD at baseline were included in this study.

Outcome

Psychological distress was measured using the Japanese version of the K6, a self-rated 6-item scale that screens for any Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) mood or anxiety disorders (18, 19). The K6 asks how often respondents have experienced symptoms of nonspecific psychological distress during the past 30 days (eg, “Did you feel nervous?”). Each item was scored on a five-point Likert scale (0=none of the time; 4=all the time). The total scores ranged from 0–24, with higher scores indicating greater psychological distress. We used a cut-off point of ≥ 14 to define SPD. A previous validation study showed that K6 scores of 14–24 give a positive predictive value of 85% for the diagnosis of any DSM-IV mood or anxiety disorder, under the assumption that its prevalence rate in a population is 5% (19). The incidence of SPD across testing times was defined as not having SPD at baseline and being identified as a new case of SPD at one of the four follow-ups.

Predictor

Employment contract was assessed by a question about employment status with nine response options (eg, self-employed worker). We selected four response options regarding employment and classified them into two categories: full-time permanent (full-time permanent employee) or precarious (part-time employee, dispatched employee from temporary labor agency, or contract or entrusted employee).

Although the classification of the employment contract was based on self-report, generally, in Japan, only workers who meet all three of the following conditions are considered to be full-time permanent workers: (i) guaranteed lifetime employment until retirement; (ii) direct hire by their employers; and (iii) full-time employment. Workers who do not meet all three criteria are considered precarious workers. Recently, full-time permanent employment has been gaining more flexibil-

ity in terms of work hours; some employees work fewer hours per day and some fewer total hours per week (20).

Covariates

A broad set of baseline covariates, which could be associated with either employment contract or psychological distress, included: (i) age (continuous), (ii) marital status (married, never married, or divorced/widowed), (iii) equalized household expenditure (quartiles), (iv) hours of work (<40 or ≥40 hours/week), (v) occupation (professional/technician, manager, sales/service/clerical, security/transportation/labor, or others), (vi) company size (1–29 employees, 30–299 employees, 300–999 employees, ≥1000 employees, or civil service offices), (vii) organizational tenure (<5 years, 5–14 years, 15–29 years, or ≥30 years), (viii) cardiovascular disease (CVD) risk (none or any), and (ix) K6 scores (range 0–13; continuous).

Equalized household expenditure was calculated by dividing household expenditure during the previous month by the square root of the household size. Company size was classified with reference to the definition of small- and medium-sized companies listed in the Japan Small- and Medium-sized Enterprise Basic Act. Civil service offices were classified as a separate category, regardless of their size, because the original survey did not ask the size of civil service offices. CVD risk was identified when participants reported being diagnosed with diabetes, hyperlipidemia, or hypertension by their physicians.

Statistical analysis

We performed all analyses separately by gender due to major differences in the ways men and women responded to key variables. First, the baseline characteristics were described as either percentages or means (SD) and were compared between precarious and full-time permanent employees. Second, discrete-time survival analyses, with a complementary log-log link, were performed to examine the effect of employment contract at baseline on the risk of incident SPD (21). This approach, which is the discrete-time equivalent of the Cox proportional hazard model, is appropriate when events that occur in continuous time are recorded at yearly intervals. The models controlled for time (ie, years since baseline) in addition to baseline covariates. The participants were censored at the first SPD event, loss to follow-up, or the end of the study period.

Finally, four sensitivity analyses were performed on subgroups. The first analyzed participants without a change in employment contract during the follow-up period (ie, the majority of all participants, at 70%) to avoid a time-dependent bias (22). Participants' employment status could change from full-time permanent or precarious employment at baseline to various options dur-

ing the follow-up period, including full-time permanent employment, precarious employment, mandatory retirement at age 60, self-employment, leaving the workplace to become a homemaker, or unemployment. Among full-time permanent employees, most changes in employment contract (40%) were because of the change to precarious employment. Similarly, among precarious employees, most changes (50%) were because of the change to unemployment. Those with a change in employment contract did not necessarily have worse mental health because the changes may occur for various reasons. The second analysis stratified participants into two groups by work hours (<40 or ≥40 hours/week) to control for the substantial differences in the distribution of work hours between precarious and full-time permanent employees. The third analysis presented precarious employment as three categories (ie, part-time, dispatched, and contract or entrusted employment) to examine whether all three types of precarious employment were equally associated with SPD incidence. The fourth analysis stratified participants into three groups by marital status (married, never married, or divorced/widowed) to examine whether the association between employment contract and SPD incidence differed by marital status. All statistical tests were two-sided, with a 5% significance level, and analyses were conducted using SAS version 9.3 for Windows (SAS Inc, Cary, NC, USA).

Results

Baseline characteristics

Table 1 shows the baseline characteristics of 8486 men and 6736 women who initially did not have SPD by employment contract. Precarious employees of both genders were more likely to have the following in comparison to full-time employees: a lower household expenditure; part-time work; be employed in security, transportation, or manual labor; and have shorter organizational tenure. Female precarious employees were more likely to be married than were female full-time employees, whereas male precarious employees were less likely to be married than were male full-time employees. Male precarious employees had higher K6 scores than did male full-time employees, whereas female precarious employees had lower K6 scores than did female full-time employees. Male precarious employees were more likely to work in smaller companies than were male full-time employees.

Precarious employment and incidence of SPD

During the maximum follow-up period of four years (median=4 years), 374 men and 364 women developed

Table 1. Baseline characteristics by gender and employment contract.

	Men								Women							
	Full-time permanent employment (N=7770)				Precarious employment (N=716)				Full-time permanent employment (N=2664)				Precarious employment (N=4072)			
	N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD	N	%	Mean	SD
Age (years)			54.4	2.7			55.2	2.7			54.2	2.7			54.3	2.7
Marital status																
Married	7068	91.0			573	80.0			2016	75.7			3531	86.7		
Never married	376	4.8			77	10.8			183	6.9			96	2.4		
Divorced/widowed	313	4.0			64	8.9			457	17.2			436	10.7		
Data missing	13	0.2			2	0.3			8	0.3			9	0.2		
Equalized household expenditure ^a																
Quartile 1 (lowest)	1711	22.0			328	45.8			798	30.0			1384	34.0		
Quartile 2	1428	18.4			129	18.0			411	15.4			818	20.1		
Quartile 3	1264	16.3			87	12.2			397	14.9			607	14.9		
Quartile 4 (highest)	2596	33.4			87	12.2			768	28.8			855	21.0		
Data missing	771	9.9			85	11.9			290	10.9			408	10.0		
Hours of work (hours/week)																
<40	594	7.6			204	28.5			429	16.1			3216	79.0		
≥40	7107	91.5			495	69.1			2204	82.7			806	19.8		
Data missing	69	0.9			17	2.4			31	1.2			50	1.2		
Occupation																
Professional/technician	1953	25.1			113	15.8			735	27.6			412	10.1		
Manager	1694	21.8			41	5.7			130	4.9			25	0.6		
Sales/service/clerical	1830	23.6			180	25.1			1265	47.5			2140	52.6		
Security/transportation/labor	1956	25.2			279	39.0			367	13.8			813	20.0		
Others	298	3.8			97	13.6			150	5.6			640	15.7		
Data missing	39	0.5			6	0.8			17	0.6			42	1.0		
Company size (number of employees)																
1–29	2003	25.8			235	32.8			892	33.5			1431	35.1		
30–299	2223	28.6			264	36.9			980	36.8			1446	35.5		
300–999	974	12.5			87	12.2			267	10.0			367	9.0		
≥1000	1737	22.4			81	11.3			240	9.0			451	11.1		
Civil service office	722	9.3			24	3.4			244	9.2			154	3.8		
Data missing	111	1.4			25	3.5			41	1.5			223	5.5		
Organizational tenure (years)																
<5	948	12.2			444	62.0			322	12.1			1616	39.7		
5–14	971	12.5			133	18.6			686	25.8			1537	37.8		
15–29	2045	26.3			50	7.0			946	35.5			641	15.7		
≥30	3426	44.1			33	4.6			598	22.5			49	1.2		
Data missing	380	4.9			56	7.8			112	4.2			229	5.6		
Cardiovascular disease risks																
None	5358	69.0			512	71.5			75.2				77.6			
Any	2412	31.0			204	28.5			24.8				22.4			
K6 score (range 0–13) ^b			2.4	3.1			2.7	3.3			2.8	3.3			2.7	3.2

^a Monthly household expenditure divided by the square root of the number of household members.

^b A self-rated 6-item scale that screens for any mood or anxiety disorder.

SPD, and 440 men and 271 women were lost to follow-up. Table 2 shows the hazard ratios (HR) and 95% confidence intervals (95% CI) of incident SPD for both genders, as computed with discrete-time survival analyses. Among men, precarious employees were more likely than full-time permanent employees to develop SPD (HR 2.00, 95% CI 1.50–2.67). The HR remained significant after adjustment for age (HR 2.12, 95% CI 1.60–2.82) and after additional adjustments for marital status, equalized household expenditures, hours of work, occupation, company

size, organizational tenure, CVD risks, and K6 scores at baseline (HR 1.79, 95% CI 1.28–2.51). In contrast for women, no significant associations were observed between employment contract and incident SPD.

Sensitivity analysis

Furthermore, sensitivity analyses confirmed the robustness of the results. In the analyses restricted to the participants without changes in their employment contracts

(table 3), precarious employment was significantly associated with incident SPD among men (fully adjusted HR 2.32, 95% CI 1.59–3.40).

In the analyses stratified by work hours (table 4), precarious employment was significantly associated with incident SPD among men, whether they worked <40 hours (fully adjusted HR 2.82, 95% CI 1.02–7.81) or ≥40 hours per week (fully adjusted HR 1.77, 95% CI 1.20–2.60).

In the analyses presenting precarious employment as three categories (see Appendix, table A, www.sjweh.fi/data_repository.php), all three types were positively associated with SPD incidence among men, although the association for dispatched employees did not reach the level of significance probably due to the small sample size. In these three sensitivity analyses, no significant associations between employment contract and incident SPD were observed among the female employees. However, in the analyses stratified by marital status, an association similar to that found among men was observed only among the unmarried women (fully adjusted HR 6.27, 95% CI 1.80–21.76) (Appendix, table B, www.sjweh.fi/data_repository.php).

Discussion

After adjusting for sociodemographic and occupational factors and CVD risks in middle-aged Japanese men, this four-year longitudinal study showed that precarious employment was associated with double the risk of SPD incidence. However, no such significant association was observed for Japanese women.

Our results among men are consistent with the findings of previous longitudinal studies conducted in Europe and North America, which indicate that precarious employment is associated with mental health indicators such as psychological distress (7–9, 11), depressive symptoms (10), and attempted suicide (12). Although, to the best of our knowledge, similar longitudinal studies conducted in Japan have not been published so far, our results are also consistent with the findings of several (23, 24), but not all (25) cross-sectional studies conducted in Japan indicating that precarious employment is associated with mental health indicators such as fatigue (24) and SPD (23). Cross-sectional approaches are limited in their ability to assess causality; thus, in order to minimize the possibility of reverse causality – that

Table 2. Hazard ratios (HR) and 95% confidence intervals (95% CI) for the incidence of serious psychological distress during the 4-year follow-up period, according to employment contract (N=15 222).

Employment contract	Cases / non-cases (N)	Crude model		Age-adjusted model		Fully adjusted model ^a	
		HR	95% CI	HR	95% CI	HR	95% CI
Men (N=8486)							
Full-time permanent	318/7452	1.00		1.00		1.00	
Precarious	56/660	2.00	1.50–2.67 ^b	2.12	1.60–2.82 ^b	1.79	1.28–2.51 ^b
Women (N=6736)							
Full-time permanent	144/2520	1.00		1.00		1.00	
Precarious	220/3852	1.00	0.81–1.24	1.01	0.82–1.24	0.96	0.72–1.29

^a Adjusted for age, marital status, equalized household expenditure, hours of work, occupation, company size, organizational tenure, cardiovascular disease risk, and K6 scores (all covariates measured at baseline). K6 is a self-rated 6-item scale that screens for any mood or anxiety disorder.

^b P<0.05.

Table 3. Hazard ratios (HR) and 95% confidence intervals (95% CI) for the incidence of serious psychological distress during the 4-year follow-up period according to employment contract, among participants with no change in employment contract (N=10 688).

Employment contract	Cases / non-cases (N)	Crude model		Age-adjusted model		Fully adjusted model ^a	
		HR	95% CI	HR	95% CI	HR	95% CI
Men (N=6047)							
Full-time permanent	275/5372	1.00		1.00		1.00	
Precarious	47/353	2.68	1.96–3.67 ^b	2.93	2.15–4.00 ^b	2.32	1.59–3.40 ^b
Women (N=4641)							
Full-time permanent	115/1635	1.00		1.00		1.00	
Precarious	181/2710	0.95	0.75–1.20	0.98	0.78–1.24	0.85	0.61–1.19

^a Adjusted for age, marital status, equalized household expenditure, hours of work, occupation, company size, organizational tenure, cardiovascular disease risk, and K6 scores (all covariates measured at baseline). K6 is a self-rated 6-item scale that screens for any mood or anxiety disorder.

^b P<0.05.

Table 4. Hazard ratios (HR) and 95% confidence intervals (95% CI) for the incidence of serious psychological distress during the 4-year follow-up period according to employment contract, stratified by hours of work, among participants without missing data on hours of work (N=15 055).

Hours of work, employment contract	Cases / non-cases (N)	Crude model		Age-adjusted model		Fully adjusted model ^a	
		HR	95% CI	HR	95% CI	HR	95% CI
Men (N=8400)							
<40 hours/week							
Full-time permanent	23/571	1.00		1.00		1.00	
Precarious	17/187	2.28	1.21–4.30 ^b	2.38	1.27–4.47 ^b	2.82	1.02–7.81 ^b
≥40 hours/week							
Full-time permanent	290/6817	1.00		1.00		1.00	
Precarious	36/459	1.86	1.31–2.64 ^b	1.96	1.39–2.78 ^b	1.77	1.20–2.60 ^b
Women (N=6655)							
<40 hours/week							
Full-time permanent	15/414	1.00		1.00		1.00	
Precarious	167/3049	1.49	0.88–2.54	1.51	0.89–2.56	1.24	0.70–2.18
≥40 hours/week							
Full-time permanent	127/2077	1.00		1.00		1.00	
Precarious	48/758	1.04	0.74–1.45	1.04	0.74–1.44	0.84	0.58–1.21

^a Adjusted for age, marital status, equalized household expenditure, hours of work, occupation, company size, organizational tenure, cardiovascular disease risk, and K6 scores (all covariates measured at baseline). K6 is a self-rated 6-item scale that screens for any mood or anxiety disorder.

^b P<0.05.

is, poor mental health leads to precarious employment status – we used longitudinal data, excluded participants with CVD, cancer, or SPD at baseline, and adjusted the analyses for baseline CVD risks and mild to moderate self-reported psychological distress (K6 score).

Unlike our study, a recent Korean longitudinal study (15) did not show any significant associations between maintaining precarious employment and new-onset depressive symptoms among either men [odds ratio (OR) 1.59, 95% CI 0.90–2.81] or women (OR 1.50, 95% CI 0.69–3.25), using one-year follow-up data from a nationally representative study. However, the trend of association in the Korean study (15) was shown to be in the same direction as the association among men in our study. The lack of significant results in the Korean study may be attributed to the shorter follow-up period and smaller sample size; thus, maintaining precarious employment may have an adverse effect on mental health in both Asian countries.

Our results suggest that a gender difference exists in the effect of precarious employment on SPD incidence. This gender difference may be due to a combination of gender roles (26, 27) and gender-oriented segregation in the labor market. Traditional Japanese gender roles – in which men are the breadwinners and women are the homemakers – are still prevalent, especially in the middle-aged and older generations (28). Regarding gender segregation, female workers form the majority of precarious employees (70% of the precarious workforce) (1). Most of the female workers who are married and whose partner is the main breadwinner voluntarily choose part-time precarious employment to balance their work and family responsibilities (29); thus, those workers may

not be at a higher risk for developing SPD. However, most of the male workers who are the main breadwinners, regardless of marital status, involuntarily choose full-time precarious employment to earn a living for their families (29). The responsibility of earning a living and having no choice but to choose precarious work may put these men at a higher risk for developing SPD. The results of stratified analyses by marital status showed that precarious employment increased the risk of SPD incidence not only among men but also unmarried women who play the role of the main breadwinner (Appendix, table B, www.sjweh.fi/data_repository.php).

The mechanisms underlying the associations between precarious employment and mental health are not well understood; however, previous studies have suggested that several factors associated with precarious employment, including job insecurity, low income, and hazardous working conditions, may increase the risk of developing negative health-related behaviors, as well as that of producing detrimental psychological and physiopathological changes leading to poorer mental health (2, 5). Previous studies have also suggested that mental health problems, some of which have already been exhibited early in life, may lead to precarious employment as well, because health problems reduce the chance of achieving a good position in the labor market (6, 30).

In addition, our results showed that precarious employees were more likely to be employed in security, transportation, or manual labor compared to full-time permanent employees. Lower socioeconomic occupations are known to be associated with some dimensions of adverse psychosocial working conditions, such as lower job control and fewer rewards, which may lead

to poor mental health (31). Thus, such adverse working conditions may mediate the effect of precarious employment on poorer mental health.

Furthermore, the length of time spent in a precarious labor market position might play an important role in poorer mental health (7, 9). We could not examine the effect of prolonged exposure to precarious employment before baseline because this variable was not measured by the LSMEP; however, such a cumulative effect may have contributed to the high SPD incidence among our male participants, considering the lower levels of employment mobility in Japan. Precarious employees cannot easily transition to becoming full-time permanent employees (32).

The strengths of the present study include its: (i) longitudinal design; (ii) large population-based sample; (iii) high retention rate; (iv) focus on the clinical level of psychological distress; (v) use of a well-known, highly validated scale for psychological distress; and (vi) adjustment for various potential confounders. Nevertheless, our study has some limitations.

First, our findings in a Japanese context should be generalized with caution because the definitions of precarious employment in this country may differ from those of other countries. Similarly, our study population was restricted to middle-aged employees, and this limits the generalizability of our findings to other age groups in Japan.

Second, the selection bias caused by participant attrition or missing data on incident SPD could have influenced our results, although our retention and response rates were relatively high. The participants with no follow-up or missing data on incident SPD were more likely to be precarious workers at baseline (Appendix, table C, www.sjweh.fi/data_repository.php), and they may have been more likely to develop SPD as a result; therefore, such a selection bias would underestimate the association between precarious employment and SPD incidence.

Finally, unmeasured factors may affect the associations between precarious employment and SPD incidence although we considered a range of confounders. One example of such a factor may be the underlying voluntary or involuntary basis for precarious employment. Previous studies have shown that employees who work in temporary positions involuntarily have higher mortality risk than permanent employees (33). Another possible confounding variable that we did not take into consideration in this study is educational attainment although we did consider other socioeconomic factors (ie, household expenditure and occupation) as confounders. Further studies are needed to more thoroughly examine the effects of such factors on this revealed association (34).

In conclusion, the results of this longitudinal study suggest that precarious employment is associated with a higher risk of SPD incidence among middle-aged Japa-

nese men. Given the increasing number of precarious jobs, in order to develop effective policies for reducing the health disadvantages caused by precarious employment, future studies should replicate this association in various age groups, examine the effect of precarious employment on other health outcomes, and explore the underlying mechanisms involved in the observed associations.

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