

The possible absence of a healthy-worker effect: a cross-sectional survey among educated Japanese women

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ABSTRACT

Objectives: Despite being highly educated in comparison with women in other member countries of the Organisation for Economic Cooperation and Development, Japanese women are expected to assume traditional gender roles, and many dedicate themselves to full-time housewifery. Women working outside the home do so under poor conditions, and their health may not be better than that of housewives. This study compared the self-rated health status and health behaviours of housewives and working women in Japan.

Design: Cross-sectional survey.

Setting: A national university in Tokyo with 9864 alumnae.

Participants: A total 1344 women who graduated since 1985 and completed questionnaires in an anonymous mail-based survey.

Primary and secondary outcome measures: Health anxiety and satisfaction, receipt of health check-ups, eating breakfast, smoking, and sleep problems according to job status and family demands: housewives ($n=247$) and working women with ($n=624$) and without ($n=436$) family demands. ORs were used for risk assessment, with housewives as a reference.

Results: After adjustment for satisfaction with present employment status and other confounding factors, working women were more likely than housewives to feel health anxiety (with family demands, OR: 1.68, 95% CI 1.10 to 2.57; without family demands, OR: 3.57, 95% CI 2.19 to 4.50) and health dissatisfaction (without family demands, OR: 3.50, 95% CI 2.35 to 5.21); they were also more likely than housewives to eat an insufficient breakfast (with family demands, OR: 1.91, 95% CI 1.22 to 3.00; without family demands, OR: 4.02, 95% CI 2.47 to 6.57) and to have sleep problems (ORs: 2.08 to 4.03).

Conclusions: No healthy-worker effect was found among Japanese women. Housewives, at least those who are well educated, appear to have better health status and health-related behaviours than do working women with the same level of education.

INTRODUCTION

In many industrialised countries, unemployed women, including full-time housewives who do not engage in paid work, are generally

ARTICLE SUMMARY

Article focus

- Better general health among workers than among the unemployed is termed as the healthy-worker effect, and this assumption is applied to women in industrialised countries.
- Many Japanese women are unemployed and engage in household chores as full-time housewives, and more than half of working women are in precarious work positions.
- Our hypothesis was that the housewife position is a health-protecting factor for Japanese women, and that working women have a greater risk of poor health than do full-time housewives.

Key messages

- No healthy-worker effect was found among well-educated Japanese women.
- Full-time Japanese housewives were less anxious about and less dissatisfied with their health and had healthier lifestyles than did working women.
- The social environment that is presumed to support workers should be reconsidered.

Strengths and limitations of this study

- All variables were measured by subjective self-reports.
- Limitation on generalisability: The observed effect of employment status on women with moderate and lower educational levels is unknown because the study used only highly educated women.
- Strength of generalisability: Study participants originated from various areas and different socio-economic backgrounds because the target university was a national institution in a metropolitan city.
- The number of female university graduates is rapidly increasing in Japan. Thus, our findings have considerable relevance to society both now and in the future.

assumed to have poorer health than do employed women. This assumption has been confirmed with subjective measurements, such as self-rated health assessments, in Denmark, Finland, Norway, and Sweden,¹ Spain,² and the USA³ and by objective measurements,

such as mortality rates, in Sweden⁴ and Spain.⁵ Thus, most countries have a shared perception that women engaging in paid work are generally healthier than are housewives; several recent studies have used this finding to assert that being a housewife is a risk factor for poor health status and is related to poverty, low education and low-skilled occupations.⁶⁻⁸

At the same time, working women are more likely to face the risks of diseases caused by workplace exposure,⁹ suffer from stress strongly associated with work,¹⁰ exhibit unhealthy behaviours during pregnancy,¹¹⁻¹² have higher alcohol consumption¹³ and report problems with child-bearing¹⁴ than are unemployed women or housewives. Additionally, workers with families face problems caused by work and family roles, which exacerbates exhaustion¹⁵ and decreases mental health.¹⁶⁻¹⁸ Despite such work-related problems, several recent studies comparing employment status reported that most unemployed women engaged in household chores in domestic settings and showed poorer mental health status than did contract workers.¹⁹⁻²⁰

Behind the common perception that workers are generally healthier than are the unemployed, including housewives, lies the concept of a healthy-worker effect. When the relationship between employment and health is discussed, at least two types of healthy-worker effects are considered. The first holds that working people are employed because they have no illness, so they are usually healthier than the general population, including the unemployed.²¹ The other is that psychological factors, such as improved self-confidence through engaging in work, a feeling of social connection, and economic independence, make workers healthier.²² Based on these assumptions about the healthy-worker effect, housewives are expected to have poorer health than working women in Japan.

In Japan, despite an advanced educational background (43% in the prime age bracket have more than upper-secondary education),²³ many Japanese women do not enter into economic activity, and most unemployed women engage in household chores as full-time housewives. Although women's participation in the workforce has increased, due in part to the Equal Employment Opportunity Law, revised in June 1985, 27% of prime-aged (25-54-year-old) women are still categorised as full-time housewives.²⁴ This high percentage may be attributed partly to the traditional Japanese gender role, which dictates that women should maintain the household, but it is also affected by an inadequate system of job assistance for women, such as childcare support and legislation banning gender discrimination in the workplace. As a result, a huge gap between the proportion of men (93%) and that of women (67%) participating in economic activity exists in Japan.²³

Although many Japanese women choose to work outside the home, more than half of working women are in precarious work positions, with part-time or outsourced work arrangements.²⁵ In this situation, female workers receive very low wages, and no social insurance system supported

by employers is provided. These workers receive only half the hourly wage of full-time workers for the same work, and the difference in conditions between these and regular workers is the largest among Organisation for Economic Cooperation and Development countries.²⁶ Given such unstable and less rewarding employment opportunities, work may be a burden for women rather than a health-promoting factor. Moreover, a comparative study investigating workers in Japan, the UK and Finland showed that female Japanese workers experienced significant conflict between the demands of home and work, which induced a poorer mental health status compared with that of male workers.²⁷ Therefore, we have doubts that the healthy-worker effect occurs among Japanese women.

The hypothesis of our study was that the housewife position would be a health-protecting factor for Japanese women and that working women would have a greater risk for poor health than would full-time housewives.

METHODS

Study population

Study participants were recruited from the alumnae of a national university located in Tokyo to produce a sample with a uniform educational level and relatively common family background. In February 2007, we sent reply, postage-paid postcards to all 9864 female alumnae who graduated from the university between 1983 and 2006 to ask them to participate and received agreement cards from 1630 (16.5% response rate) by the end of March. We then mailed self-administered questionnaires in April, and received 1515 responses (valid response rate, 15.4%) by the end of May. Of these respondents, 163 alumnae who graduated before June 1985 were excluded based on the consideration that the Equal Employment Opportunity Law was amended at that time. Prior to survey distribution, the Institutional Review Board of Teikyo University School of Medicine approved the study.

Job status and family demands

To assess the effects of both work and family conditions on health status, we divided participants into three groups according to family demands and job status: housewives, working women with family demands and working women without family demands.^{1-3 11 12} Data from only 1344 participants were used for analysis because eight participants provided an ambiguous description of their family or job status. Housewives ($n=247$) were defined as those who did not engage in paid work and lived with family members who needed care, including children, husbands and elderly parents. Working women with family demands ($n=624$) were defined as those who engaged in paid work and had family members as described above; working women without family demands ($n=436$) were those engaged in paid work and had no family member who needed care. Those who did not engage in paid work and had no family demands, such as students or single

unemployed women living alone, were excluded from the analysis because of the study purpose and the relatively small number ($n=37$) of such individuals.

In addition to job status and family demands (marital status and family members), participants were also asked about their age, place of residence (the first three zip-code digits), subjective socioeconomic status (upper, upper-middle, middle, lower-middle or lower), satisfaction with present employment/unemployment status (well satisfied and satisfied versus not very satisfied and unsatisfied) and the length of time at their present employment/unemployment status. Working women were asked to report average working hours per month, employment contract based on the Labour Survey in Japan²⁵ and shift-work status.

Health status and behaviour: self-rated health, lifestyle and preventive behaviour

Because study participants were expected to be generally healthy and their cooperation with this study was solicited via mail, we used subjective health indicators in the questionnaire. Among women aged 20–44 in Japan, suicide and malignant neoplasm account for almost 60% of the causes of death.²⁸ For this reason, we used health outcomes to assess health status preceding suicide and lifestyle-related diseases, self-rated health, lifestyle, and preventive behaviour and knowledge.

Anxiety regarding health (general, physical and mental) was addressed to screen for symptoms of depression, which precede most suicides.²⁹ Based on previous studies,³⁰ satisfaction in terms of health (well-satisfied and satisfied versus not very satisfied and unsatisfied) was explored because the level of health satisfaction was expected to predict the level of health status associated with lifestyle and sociodemographic characteristics.

Respondents were asked to report what they ate for breakfast and how frequently they ate it each week, and this information was summarised as a binary variable: consumption of a staple food and main dish every morning (sufficient breakfast) versus no such consumption. Sleep conditions were explored based on previous studies.^{30 31}

Health-related behaviours, including utilisation and knowledge of health services, were also assessed by asking respondents whether and where they had received a health check-up within the past year and whether they had sought medical consultation within the past year. Both kinds of utilisation of health services involved preventive behaviours, but they differed in terms of phase and cost: the former was usually provided in the absence of any objective or subjective symptoms and almost all costs were covered by employers or local government; the latter was usually initiated in response to symptoms or suspicion of disease, and patients were responsible for at least 30% of consultation fee. The following questions were asked regarding knowledge of the healthcare system: ‘Did you know that employers have to offer workers the opportunity to receive a health check-up at

the workplace at least once per year?’ and ‘Did you know that the local government has to offer residents over 40 years old the opportunity to receive a health check-up in their community at least once per year?’

Statistical analysis

The first step in the statistical analysis was to obtain frequency counts (categorical variables) or median and 25th–75th percentiles (the distributions of continuous variables were not assumed to be normal) of all variables of interest for the three groups according to employment and family status.

Second, a χ^2 test was used to compare the housewife group with the other two groups in terms of categorical variables, and a Wilcoxon rank-sum test was used to compare the groups with respect to continuous variables. Because sleep problems were expected to be associated with irregular lifestyle patterns, such as those involved in shift work and parenting of small children, sleep-related parameters were analysed with and without these risk factors.

Finally, multiple logistic regression analyses were conducted to estimate the ORs and 95% CIs for health measurements in association with employment and family status, after adjusting for confounding effects. For the main explanatory variables, housewife status was used as the reference for working women with and without family demands. As important confounding variables, age, marital status, subjective economic condition and satisfaction with present employment status were used and confirmed by goodness-of-fit in the final model using the likelihood-ratio test. Because married status was a trade-off of the status of having paid work between housewives and working women without family demands, logistic regression analyses were conducted with adjustment for confounding variables other than marital status.

Data analyses were conducted using STATA, V.9.1.³² All tests were two sided, and Bonferroni’s adjustment was applied to the significance level in the case of multiple comparisons. A p value <0.05 was considered significant for the ORs.

RESULTS

Basic characteristics of housewives and workers

The basic characteristics of the three groups are shown in table 1. Most housewives were married (98%) and lived with a partner and/or children (91%). Their median age was 37 years, and 23% lived in the metropolitan area (Tokyo’s 23 wards). Almost half (47%) considered their economic condition to be upper or upper-middle class, and 62% were satisfied with their present status.

The age distribution of working women with family demands was similar to that of housewives, but their marriage rate (93%) was significantly lower than that of housewives (98%). Most working women were employed as permanent workers (59%), and their subjective economic condition and length of tenure at their current

Table 1 Basic characteristics of study participants by employment status and family demand

Number (%) or median (25–75% range)	Housewives (n=247)	Working women with family demands (n=624)	Working women without family demands (n=436)
Age, years (range)	37 (33–40)	37 (33–41)	29 (26–34)**
Marital status			
Yes	241 (98)	581 (93)*	10 (2)**
No (unmarried, divorced, widowed)	6 (2)	43 (7)	426 (98)
Living situation†			
Alone	0 (0)	1 (0.2)	246 (56)
With partner and/or children	225 (91)	548 (88)	0 (0)
With others	22 (9)	76 (12)	190 (44)
(redisplay) With preschool-aged children	139 (56)	218 (35)	0 (0)
Place of residence‡			
Tokyo's 23 wards	56 (23)	171 (27)*	168 (39)**
Urban area	58 (23)	117 (19)	76 (17)
Rural area	132 (54)	335 (54)	191 (44)
Subjective economic conditions‡			
Upper	5 (2)	14 (2)	8 (2)**
Upper middle	110 (45)	288 (47)	129 (30)
Middle	123 (50)	260 (42)	215 (50)
Lower middle	8 (3)	49 (8)	74 (17)
Lower	0 (0)	6 (1)	7 (2)
Average working time, hours/month (range)	–	160 (96–200)	190 (161–220)
<i>Employed as a permanent worker</i>	–	367 (59)	344 (79)
Shift work (regularly and sometimes)	–	79 (13)	79 (18)
Length of time in present status‡, years (range)	7 (4–12)	9 (4–15)	5 (3–9)**
Satisfaction with present status‡ (Satisfied)	88 (62)	507 (83)**	331 (78)**

*p<0.025, **p<0.005 (versus housewives).

†Not analysed in the comparison because it was used for grouping.

‡The total number of participants does not match because of missing values.

job were similar to those of housewives. However, more working women than housewives were satisfied with their present job status (83%). In other words, the proportion of housewives satisfied with their full-time housewife status was less than the proportion of working women satisfied with their employment status.

The demographic characteristics of working women without family demands were very different from those of housewives. Most working women were young (median age, 29 years), not married (98%), and living alone or with someone other than a partner or child. Although most were employed as permanent workers (79%), a significantly lower proportion (32%) of working women than of housewives (47%) described their economic status as upper or upper-middle class. However, working women were significantly more satisfied with their present job status (78%) than were housewives (62%).

Because shift work and/or preschool-aged children were thought to be risk factors for sleep-related problems, the three groups were compared in terms of the proportions of participants with those risk factors. The housewives group contained the highest proportion (n=139, 56%) of those with these risk factors; this was followed by working women with family demands (n=297, 48%) and working women without family demands (n=79, 18%).

Those proportions reflect statistically significant differences among groups.

Health status and behaviour

Anxiety about health was greater among working women without family demands than among housewives (table 2). Greater percentages of working women with and without family demands than of housewives ate insufficient breakfasts. The smoking rate was higher in working women without family demands than in housewives. Sleep duration was shorter in both groups of working women, and dissatisfaction with sleep was more frequently reported by working women without family demands than by housewives, after excluding those living with preschool-aged children and those working shifts. More working women with and without family demands than housewives had received a health check-up in the past year; housewives tended to receive a health check-up at the facility designated by the health service of their partner's employer, followed, in descending order of frequency, by a community service or at their own expense. However, the frequency of medical consultation in the past year and knowledge of the healthcare system in the community was lower in working women without family demands than in housewives.

Table 2 Health status and behaviours by employment and family demand

Number (%) or median (25–75% range)	Housewives (n=247) (109)†	Working women with family demands (n=624) (349)†	Working women without family demands (n=436) (357)†
Anxiety about health‡			
Total (Yes)	74 (30)	221 (36)	208 (48)**
Physical	46 (19)	154 (25)	122 (28)**
Mental	24 (10)	65 (11)	80 (19)**
Dissatisfaction with health‡	57 (23)	141 (23)	136 (31)
Insufficient breakfast‡ (not a well-balanced breakfast, or not every morning)	51 (21)	199 (32)**	240 (55)**
Smoking‡	3 (1)	12 (2)	27 (6)**
Sleep‡ (Upper: total participants; lower‡: participants without preschool-aged children and not working shifts)			
Sleep, hours/night (range)	7 (6–7)	6 (6–7)**	6 (6–7)**
	7 (6–7)	6 (6–7)*	6 (6–7)**
Feeling of dissatisfaction	92 (37)	262 (42)	222 (51)**
	36 (33)	157 (45)	174 (48)**
Difficulty getting to sleep§	20 (8)	48 (8)	50 (11)
	6 (6)	25 (7)	39 (11)
Waking during sleep¶	137 (55)	283 (45)*	129 (30)**
	39 (36)	130 (37)	110 (31)
Early-morning awakening¶	18 (7)	50 (8)	39 (9)
	4 (4)	27 (8)	28 (8)
Quality of sleep††	30 (12)	46 (7)	40 (9)
	3 (3)	20 (6)	31 (9)
Health check-up in past year (Yes) (category: multiple answers)			
At workplace	126 (51)	500 (80)**	398 (91)**
At community service	17 (7)	379 (61)	356 (82)
At school	40 (16)	76 (12)	22 (5)
At partner's workplace	6 (2)	5 (1)	21 (5)
At own expense	55 (22)	36 (6)	0 (0)
Other	22 (9)	69 (11)	47 (11)
Other	2 (1)	5 (1)	1 (0.2)
Medical consultation in past year‡	93 (38)	236 (38)	126 (29)*
Knowledge of the healthcare system‡			
Workplace	210 (85)	515 (83)	364 (83)
Community area	205 (83)	508 (81)	249 (57)**

*p<0.025, **p<0.005 (versus housewives).

†Number of participants who lived without preschool-aged children and did not work shifts.

‡The total number of participants does not match because of missing values.

§More than 31 min.

¶More than once per week.

††Insomnia.

Table 3 shows the risks for poor health status and behaviours in working women, adjusted for confounding variables. Anxiety about health was more prevalent in working women without family demands, whereas anxiety about general and physical health was more prevalent in working women with family demands. Furthermore, working women without family demands showed a significantly higher risk of being dissatisfied with their health status.

An insufficient breakfast and shortage of sleep were significantly more frequent in both sets of working women than in housewives. Shortage of sleep remained significant after exclusion of those living with preschool-aged children. Sleep dissatisfaction was also significantly more frequent

among working women without family demands and those working shifts, and 'difficulty falling asleep' was significantly more common in both sets of working women.

Significantly more working women with and without family demands than housewives had received a health check-up in the past year. Although knowledge about the healthcare system at the workplace was not significantly different among groups, significantly more working women without family demands than housewives were uninformed regarding community-based healthcare.

DISCUSSION

When we compared the health status and health-related behaviours of the working women and housewives in the

Table 3 Risk of poor health *status and behaviours* in working women in comparison with housewives (OR, 95% CI, and p values)

	Working women with family demands‡		Working women without family demands§	
	OR*, 95% CI	p Values	OR†, 95% CI	p Values
Anxiety about health				
Total (Yes)	1.68 (1.10 to 2.57)	0.016	3.57 (2.19 to 5.80)	<0.001
Physical	1.70 (1.04 to 2.78)	0.034	2.59 (1.49 to 4.50)	0.001
Mental	1.40 (0.73 to 2.69)	0.314	2.58 (1.30 to 5.13)	0.007
Dissatisfaction with health	1.10 (0.70 to 1.72)	0.679	3.50 (2.35 to 5.21)	<0.001
Insufficient breakfast (not a well-balanced breakfast or not every morning)	1.91 (1.22 to 3.00)	0.005	4.02 (2.47 to 6.57)	<0.001
Smoking	2.51 (0.32 to 19.6)	0.382	6.74 (0.85 to 53.6)	0.071
Sleep: (Upper: total participants; Lower: participants without preschool-aged children and not working shifts)				
Sleep shortage (<6 h/night)	1.81 (1.23 to 2.66)	0.003	4.20 (2.65 to 6.66)	<0.001
Feeling of dissatisfaction	2.08 (1.16 to 3.70)	0.013	4.03 (2.06 to 7.88)	<0.001
Difficulty in getting to sleep¶	1.29 (0.82 to 2.02)	0.275	2.15 (1.25 to 3.70)	0.006
Waking during sleep**	1.87 (0.96 to 3.65)	0.068	2.33 (1.10 to 4.93)	0.027
Early-morning awakening**	0.83 (0.57 to 1.21)	0.335	0.93 (0.60 to 1.43)	0.741
Quality of sleep††	2.16 (1.14 to 4.09)	0.019	2.70 (1.36 to 5.36)	0.004
Health check-up in past year	0.77 (0.51 to 1.19)	0.240	0.66 (0.41 to 1.06)	0.086
Medical consultation in past year	1.33 (0.74 to 2.38)	0.344	1.30 (0.68 to 2.49)	0.427
Knowledge of the healthcare system:	1.03 (0.69 to 1.53)	0.894	0.98 (0.62 to 1.55)	0.931
Uninformed about workplace healthcare	1.57 (0.82 to 3.01)	0.176	1.54 (0.75 to 3.16)	0.242
Uninformed about community healthcare	0.76 (0.51 to 1.14)	0.186	0.85 (0.54 to 1.34)	0.486
Health check-up in past year	1.05 (0.59 to 1.88)	0.866	1.34 (0.71 to 2.55)	0.371
Medical consultation in past year	3.50 (2.35 to 5.21)	<0.001	17.0 (9.13 to 31.7)	<0.001
Knowledge of the healthcare system:	1.12 (0.76 to 1.66)	0.560	1.05 (0.66 to 1.66)	0.845
Uninformed about workplace healthcare	1.38 (0.81 to 2.34)	0.234	0.81 (0.44 to 1.51)	0.512
Uninformed about community healthcare	1.42 (0.84 to 2.40)	0.192	2.89 (1.68 to 4.99)	<0.001

*Adjusted for age, subjective economic condition, marital status and satisfaction with present status.

†Adjusted for age, subjective economic condition and satisfaction with present status.

‡The number of participants analysed was 871:247 housewives and 624 working women with family demands. Analyses of the risk of sleep problems considering the effects of preschool-aged children and working shifts included 458 participants (109 housewives and 349 working women with family demands).

§The number of participants analysed was 683:247 housewives and 436 working women without family demands. Analyses of the risk of sleep problems considering the effects of preschool-aged children and working shifts included 466 participants (109 housewives and 357 working women without family demands).

¶More than 31 min.

**More than once per week.

††Insomnia.

study population, housewives had a lower risk of: anxiety about health, health dissatisfaction, a pattern of eating an insufficient breakfast, sleep problems and being uninformed about the healthcare system.

The proportion of working women receiving health check-ups was significantly higher than that of housewives. However, this result must be interpreted carefully. Workplace health check-ups are mandatory in Japan under the Occupational Safety and Health Law, and are readily available because they are often provided during working hours. Thus, a higher frequency of working women utilising the opportunity to receive health check-ups was expected. Additionally, although anxious, housewives might feel a health check-up to be less necessary than do working women. Therefore, the lower frequency of obtaining a health check-up may not necessarily mean poorer health behaviour.

Anxiety about health was an important subjective symptom among the working-age population because this cohort was exposed to many sources of psychological distress.²⁹ As previous studies have indicated, questions about anxiety related to health measure not only health itself but also expectations.³³ Anxiety about health among working women may derive from their jobs in that they may be unsure about whether they can survive in a work situation, a factor that was not a problem for housewives. According to a previous longitudinal study, the health status of female workers in Japan with both regular and fixed-term employment deteriorated after 2004. An a posteriori hypothesis suggested that the increase in precarious non-regular work may have been the main cause of the deterioration in workers' health.³⁴ The working conditions of non-regular workers are known to be very poor compared

with those of regular workers in terms of salary and welfare systems,²⁶ and opportunities to be a full-time regular worker are very limited. Indeed, it is often the case that only new graduates became regular workers.³⁵ The system governing the labour market and working conditions may contribute to workers' demands to maintain and improve their health.

We found a significant difference between housewives and working women without family demands in terms of demographic characteristics, especially among younger members of the latter group. Our data indicated that many younger workers did not marry and devoted themselves to regular paid work. In the context of the aforementioned labour market and working conditions, many Japanese women face a choice between a career and marriage. This situation may support the aforementioned assumption that workers feel unsure about whether they can survive in the work environment.

Despite the indication that housewives were significantly less satisfied with their present work status than were working women, they did not participate in the labour market. When asked in the survey why they chose their present status, 15% of housewives ($n=36$) answered that they retired from work because of their own health problems (data not shown). We conducted an additional analysis excluding those housewives who had retired for health reasons and found that the risk for poor health was higher among working women. This result indicates that housewives who had retired for health reasons were in poorer health than were housewives in general. Although housewives had better health during the survey period than did working women, they may have had poorer health in the past, when they were working. Consequently, in Japan, employment may not contribute to improving the health of working women and may, as a result, render healthy women reluctant to re-enter the work force.

In previous studies in which working women were found to have better health than unemployed housewives, researchers described several limitations of their conclusions. Although healthy female workers have been identified, poor health status has also been reported among the younger generation suffering from the burden of the multiple roles of housewife, mother and employee.³⁶ Our finding that working women with family demands were in poorer health could be explained by these multiple roles. Although this finding cannot explain why working women without family demands were also in poorer health, the difficult working conditions in Japan may explain the poorer health of the younger generation. Furthermore, the lack of a protective effect of having children in the home could explain the health discrepancy. Marriage and parenthood mediate poor mental health among the unemployed,¹⁹ and this effect could be associated with our finding of better health in housewives.

The excess mortality among single working mothers has been associated with the absence of support from a

marital partner.²² More than half of Japanese working women are in precarious work positions,²⁵ and such working conditions are not especially positive from a financial perspective.²⁶ Moreover, male Japanese workers with family demands tend not to devote time to their domestic situations. Indeed, male workers work longer hours than do female workers, and more than half of men participate in leisure activities and regular drinking sessions more frequently than do women.¹⁸ In addition to the lack of childcare, we think that Japanese working women, similar to single mothers, may suffer from the burdens associated with holding multiple roles related to work and home. Thus, it is not surprising that we found no healthy-worker effect among working women.

Although the job assistance available to working women is inadequate, several systems support housewives in Japan. For example, Japan has had a universal public pension and health insurance system since 1961, and all citizens must participate in these systems. Japan's pension system provides full-time housewives with various privileges under certain conditions.³⁷ If a citizen's spouse is a salaried worker and the citizen's annual income is less than 1 300 000 yen (GBP10 000 based on a 130 yen/pound exchange rate), the citizen qualifies for a national pension without paying premiums. The health insurance system is based on the same principle, and salaried workers married to low-income citizens reap some benefits in terms of tax exemptions. In the context of the sex gap characterising earning³⁷ and participation in economic activities,²³ this spousal support system is utilised primarily by women. Additionally, housewives who are divorced or widowed are granted privileges in their tax and social welfare allowances. Indeed, the conditions under which a widow can claim exemption differ by sex. Until 2009, allowances for dependent children were provided only to women in Japan. These aspects of the social environment may encourage healthy women to remain in the home and improve their health.

As a preliminary study, we analysed data from a nationally representative survey, the 2007 Comprehensive Survey of Living Conditions of the People on Health Welfare³⁸ to assess the effect of employment status on the self-rated health of women in the cohort aged from 22 to 44 years. Subjects were divided into three groups according to job status and marital status: married subjects engaging in housework ($n=2153$), married subjects engaging in paid work ($n=2989$) and unmarried subjects engaging in paid work ($n=408$). We conducted similar multiple logistic regression analyses to estimate the risk for poor self-rated health. When married women engaging in housework were used as the reference group, the adjusted OR of poor self-rated health among married working women was 1.00 (95% CI 0.84 to 1.21) and that among unmarried working women was 0.96 (95% CI 0.77 to 1.12). We found no evidence that working women had a significantly better health status than did housewives, even when income levels were

subjected to greater control (upper 25% or lower 75%) to test the effect of socioeconomic status, which was used to approximate educational background. Although the definitions of the groups used in the preliminary study were not identical to those used in the present research, our study is consistent with these national data in terms of the health of working women in Japan.

This study has several limitations. First, all variables were measured by self-reporting. Objective measures of health status, such as biochemical examinations and physiochemical studies, would be more appropriate for inclusion in evidence-based assessments of health status. It may be feasible to use objective measures to study individuals who belong to a particular health-related group, such as hospital patients, disease or accident survivors, and students in a maternity or parenting class, by visiting the appropriate venue. According to other questionnaire-based research that relied on mailed surveys or interviews, the observed result should be interpreted as in the range of subjective health status.

Second, all participants were adult women who had graduated from a university, which may have affected the generalisability of the results because such people often come from higher-income families.²³ However, the university in question was a national university located in a metropolitan area, and the tuition at this institution was lower than that in private universities. A report issued by the Japan Association of National Universities indicated that more students with lower income levels attend national than private universities and that national universities can mitigate regional economic disparities between metropolitan and rural areas.³⁹ Metropolitan areas tend to attract more than the national average of individuals aged approximately 20 years, probably due to the educational and employment opportunities available in such places.⁴⁰ Therefore, students are expected to come to these areas from a variety of locations around the country. Thus, it is reasonable to assume that participants were drawn from a variety of socioeconomic backgrounds. Additionally, according to a 2007 national survey,²⁴ the number of female university graduates has increased in recent decades, from 13.8% among women now in their early 40s to 26.9% among those now in their late 20s. Based on these findings and the study limitations, our results can be generalised as representative of well-educated women, a group whose numbers are expected to increase in the future.

We recruited study participants by asking for voluntary participation, and 16.5% of candidate subjects showed a willingness to participate. Moreover, the final response rate was 15.4%. We propose two reasons for such a low response rate. First, it is possible that some potential participants lacked confidence. This survey, which was conducted with the cooperation of the alumnae association, was the first experience available to this group via this channel. Indeed, the alumnae association had never released contact information for the purpose of a particular study. Owing to the increased emphasis in Japan

on the protection of personal information, many people have become very sensitive about the use of their private address, even for a purpose related to public welfare. This has been particularly so since the Personal Information Protection law went into effect in April 2005, which was just before this survey was conducted. Many potential respondents may have reacted with suspicion to our mailed solicitation of participation. In fact, the alumnae association received a number of inquiries to confirm that this survey was endorsed by the association. This would indicate that many potential participants were sceptical and did not take action.

The complexity of the study design may have been another reason for the low response rate. The survey was implemented in two phases, recruitment and participation. The complexity of the procedure may have operated synergistically with the aforementioned lack of confidence, in that potential respondents were unable to obtain more detailed information about our study, including the actual questionnaire, until they received the second mailing. Moreover, transfer students were unable to participate owing to the two-phase procedure, because the school and fiscal years in Japan begin in April. The effect of not updating contact information on the low response rate remains unknown, but can be estimated as very small because the alumnae association frequently uses this contact information to send alumnae bulletins at regular intervals.

Thus, from the perspective of selection bias, study participants may have held positive attitudes towards public health and related research and maintained relatively stable lifestyles. The effect of the former tendency is ambiguous, but the latter tendency may have improved the accuracy of our findings given that life transition was a confounding factor.

We recruited study participants by providing limited information about the study purpose and used several key words, employment status and health, in our recruitment efforts. This approach may have selectively included those who were interested in employment status and/or health. Study participants might be more health conscious than those who did not participate, and their health behaviours might, therefore, be better than those of women of the same age in the general population. Additionally, study participants may have been more worried about their health status as it relates to their job than were those who did not participate (eg, participants who retired because of health problems or those who were suffering from health problems caused by employment-related stress). As a result, the study participants may have had poorer health status than the general female population of the same age. However, such self-selection bias could work in both directions, and it would not be evident which effect was stronger.

Classification errors were unlikely because we divided the participants into housewives and two categories of working women based on objective conditions, such as asking about employment status, marital status and

living with family members. Although our study design was not longitudinal or interventional, we were able to obtain a sufficient sample size with relatively few missing data.

CONCLUSIONS

This study found no healthy-worker effect among Japanese women. Japanese housewives, at least those who are well educated, appear to have sufficient knowledge to maintain their health, to be less anxious about health, and to have healthier lifestyles than working women.

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