

Original

Labor factor barriers to seeking medical services among metropolitan workers: a cross-sectional analysis by sex using the J-SHINE study

Liyong Pei¹, Satoshi Toyokawa¹ and Yasuki Kobayashi¹

¹Department of Public Health, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan

Abstract: Objectives: There is limited evidence on the relationship between labor factors and the decision to refrain from seeking medical services. This study aimed to examine how labor factors are related to medical service access among male and female workers in Tokyo and surrounding areas. **Methods:** We used data from 4,385 respondents to the survey in the Japanese Study on Stratification, Health, Income, and Neighborhood (J-SHINE), an ongoing epidemiologic household panel study. Surveys from 2010 to 2011 were analyzed. The outcome variable was whether or not an individual refrained from seeking medical services. Labor factors included employment type (permanent, temporary, or self-employed), company size (<100, 100-1,000, or >1,000 employees) and occupation type (white-collar, blue-collar). **Results:** We included a total of 2,013 people after excluding those with missing data (analysis utilization: 45.9%). After adjusting covariates, we found that men working in small companies were more likely to refrain from seeking medical services than were those in medium or large companies (adjusted prevalence ratio [PR]: 1.19, 95% confidence interval [CI]: 1.04-1.37). Among women, however, those in self-employment (PR: 1.38, 95% CI: 1.08-1.77) and blue-collar employment (PR: 1.24, 95% CI: 1.04-1.47) were more likely to refrain than were those classified as permanent or white-collar workers. **Conclusions:** The relationship between labor factors and refraining from seeking medical services differed among men by company size, and among women by employment type and occupation type. (J Occup Health 2017; 59: 418-427)

doi: 10.1539/joh.16-0242-OA

Key words: Access to health care, Company size, Employment type, Occupation type, Refraining from seeking medical services

Introduction

In most countries, equal access to medical services is a major policy concern for achieving health equity^{1,2}. However, access to healthcare services is affected by coverage³ and other factors including socioeconomic circumstances^{4,4}, care-seeking behaviors⁵, and the behavior of healthcare providers⁶. There is abundant evidence that age, sex⁷, income^{8,9}, cohabitation status¹⁰, ethnicity¹¹, and employment status¹² may affect accessibility of health care. However, little attention has been given, in Japan or in other countries, to the relationship between labor factors and refraining from seeking medical services^{4,13-15}.

Japan has three major forms of public health insurance, which together provide universal coverage¹⁶. Generally, except for individuals qualified to receive public assistance (*seikatsu-hogo*)—a livelihood protection system that allows those below a certain standard of income to maintain a minimum standard of living and receive medical services at no cost—everyone living in Japan must be covered by the public health insurance system⁹. Insured workers and their family members essentially pay 30% of the actual medical costs, with the monthly fees for health insurance depending on the type of insurance and the previous year's income. Health insurance types differ by job: there are insurance schemes for company and government employees, and the National Health Insurance scheme for others <75 years old, including self-employed workers, farmers, retirees, and unemployed people. Despite the availability of public insurance coverage, according to a survey by the Health and Global Policy Institute (HGPI), 26% of people have refrained from seeking medical serv-

Received October 17, 2016; Accepted June 24, 2017

Published online in J-STAGE August 8, 2017

Correspondence to: S. Toyokawa, Department of Public Health, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan (e-mail: toyokawa@m.u-tokyo.ac.jp)

Supplementary materials (Appendices) are available in the online version of this article.

ices for financial reasons. This statistic underscores the role of economic power in accounting for differences in accessibility of health care¹⁷⁾. Restriction of access to medical services in Japan has recently been taken up as an important issue in need of attention^{14,15)}.

Most existing research about refraining from seeking medical services has focused on unemployed, rather than employed people^{10,12)}. However, people with regular jobs have been reported as more likely than non-employed people to fail to receive medical services, even if they have greater need for medical treatment¹⁸⁾. Employment status, including factors such as worksite policies and working conditions, may prevent an earlier visit to a doctor when the need arises; therefore, we surmised that employment status might also be correlated with health service access. To the best of our knowledge, no epidemiological study has examined whether work-related factors are associated with a failure of working people in Japan to seek medical services when such services are needed.

Against this backdrop, we undertook this study to identify working conditions related to refraining from seeking medical services for any pertinent health-related need. This research investigated three factors of employment status: employment type, company size, and occupation type, all of which are important indicators of social status of both male and female employees in Japan¹⁹⁾. The study focused on workers living in metropolitan Tokyo and surrounding areas to examine whether the employment status factors were related to the decision to refrain from seeking care.

Subjects and Methods

Participants

The present analyses are based on cross-sectional data from the first survey of the Japanese Study of Stratification, Health, Income, and Neighborhood (J-SHINE, 2011). J-SHINE is an ongoing epidemiological household panel study, representing residents aged 25-50 years in metropolitan Tokyo and neighboring areas. The Internal Review Board of The University of Tokyo approved the study protocol (approval number 3073). Secondary use of the data was approved by the data management committee of the J-SHINE research group, with personally identifiable information deleted to ensure confidentiality. Further details on J-SHINE can be found elsewhere²⁰⁾. The surveys were computer-based and self-administered unless the participants requested a face-to-face interview. We used the data from the first-wave study, which was performed from July 2010 to February 2011. The area covered four municipalities in and around Tokyo (two in the Tokyo metropolitan area and two in neighboring prefectures). Stratified random sampling of residents aged 25-50 years was performed to form a group of subject regional citizens. Of the 13,920 residents to whom surveys

were sent, information was collected from 4,385 (response rate: 31.5%). We excluded those who did not provide valid responses to questions about age, sex, marital status, family members, educational attainment, household income, self-rated health, physical activity, smoking status, alcoholic status, hours worked per week, job stress, health literacy, type of employment, company size, occupation type, experience refraining from seeking medical services, and use of medical services in the preceding year. Fig. 1 shows the flow of inclusion for subjects in the present study.

Dependent variable

Participants were asked the question: "During the past year, did you refrain from seeking medical services when you were ill or injured? This includes mild cold symptoms and dental problems." Three response options were available: "Yes, I did," (classified as "refraining from seeking medical services"), "No, I didn't," ("not refraining from seeking medical services"), or "I was not sick or injured."

Independent variables

Type of employment (permanent, temporary, or self-employed), company size (small: <100; medium: 100-1,000; or large: >1,000 employees) and occupation type (white-collar: professional, managerial, administrative, clerical, service, and/or sales work; or blue-collar: agriculture/fishery work, craft/trade work, machine operation and/or assembly, or basic manual work) were used as indicators of labor factors.

Covariates

The J-SHINE survey collects data on the following variables: sex; age (25-29, 30-39, or 40-50 years); marital status (married or not married); number of household members (1, 2, or ≥ 3); educational attainment (high school graduate or less, or 2-year college graduate or higher); self-rated health (defined based on the response to, "How would you rate your health condition?" on a 5-point scale from 1 [good] to 5 [poor], and further extrapolating "good" as 1-3 and "poor" as 4 or 5); physical activity²¹⁾ (defined based on the response to "How many days did you exercise for more than 10 min on average per week in the last year?," with responses "I exercised daily," "I exercised 5-6 days a week," and "I exercised 3-4 days a week" categorized as "physically active," and "I exercised 1-2 days a week," "I exercised several times a month," or "I rarely exercised" categorized as "physically inactive"); smoking status (defined as the response to "Do you usually smoke, or did you smoke in the past?," with "Yes" categorized as "smoker," and "No, but I did smoke in the past" and "No, I've never smoked" categorized as "non-smoker"); alcoholic status (non-alcoholic or alcoholic [CAGE screening test for alcoholism ≥ 2]); hours

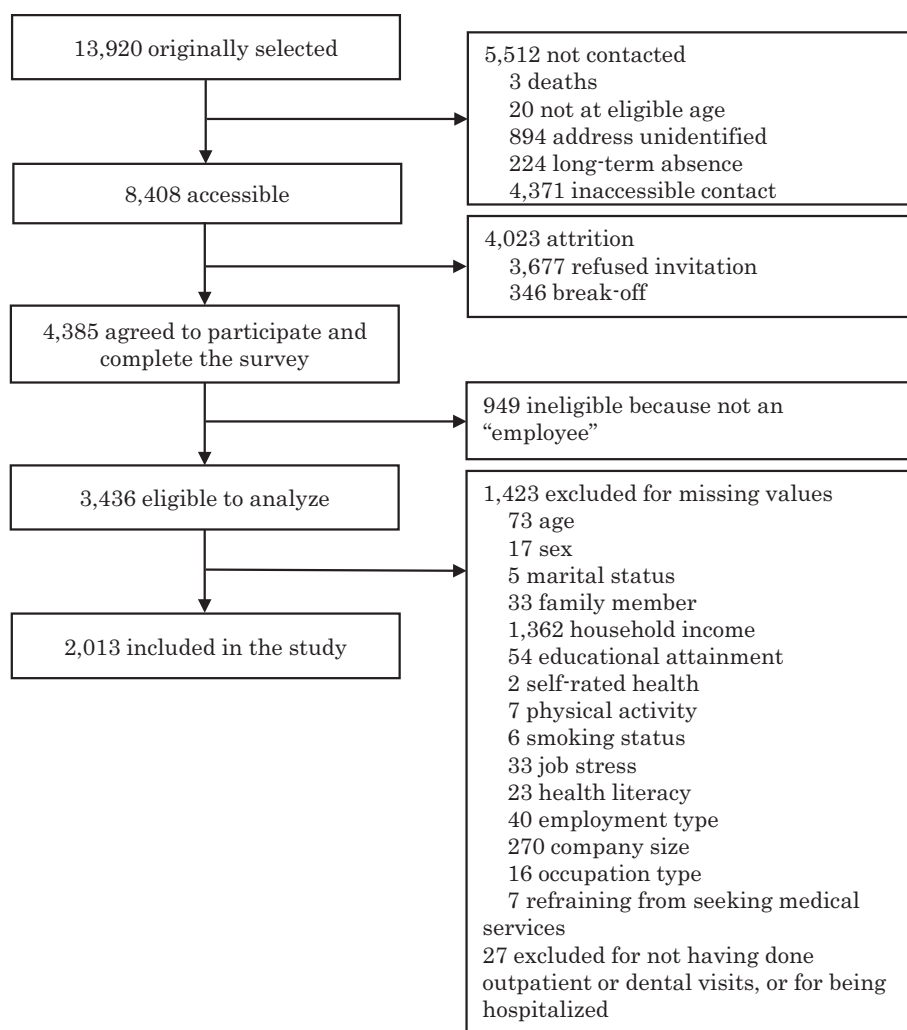


Fig. 1. Inclusion flow of study participants from the Japanese Study on Stratification, Health, Income, and Neighborhood (J-SHINE)

worked per week (≤ 40 hours or > 40 hours), job stress^{22,23} (summed scores from the seven items were divided into tertiles, with the third tertile defined as “high job stress”); health literacy²⁴ (defined as the summary score of the five responses to, “How confident are you in the following skills of dealing with information regarding health promotion or medical care?”, with a score ≥ 4 defined as “high health literacy”). Regarding annual household income, respondents were asked to select from among 15 choices ranging from $< 250,000$ yen/y to ≥ 20 million yen/y. We simplified this into (all figures in yen): < 2.5 million, 2.5–3.5 million, 3.5–5.05 million, or > 5.05 million. As the socioeconomic status measure, we used equalized household income computed as the square root of the number of household members. For the analysis, equalized household income was divided into the same quartiles as above.

Statistical analyses

We used a chi-squared test to examine differences on each variable between those who did and did not refrain from seeking medical services. Poisson regression analysis was used to compute adjusted prevalence ratios (PRs) and 95% confidence intervals (95% CIs) with robust generalized linear models, for refraining from seeking medical services.

We employed three models for this analysis: (1) employment type, (2) company size, and (3) occupation type. As covariates, we used factors that have been mentioned in previous studies^{7–10,12,14,15} and variables that were significantly associated with refraining from seeking medical services (Table 2); including, marital status, number of household members, educational attainment, equivalent household income, self-rated health, physical activity, smoking status, alcoholic status, hours worked per week, job stress, and health literacy.

The potential for multicollinearity was examined for-

mally through variance inflation factors (VIFs) for each regression coefficient. For all models estimated in this study, VIFs were below 2.0. We used Stata 14 (StataCorp LP, College Station, TX, USA) for statistical analysis. $P < 0.05$ was considered statistically significant.

Results

Complete data were obtained from 2,013 (14.5%) of respondents and were analyzed. Table 1 shows the distributions of the study variables among men and women. In total, 48.6% of men and 49.4% women reported refraining from seeking medical services at some time. Men who responded were more likely to be college graduates or higher, have higher equivalent household income, be in good health condition, be current smokers, be alcoholic, work >40 hours/wk, and have high job stress. The proportion of permanent employment was higher among male than female workers. The proportion working in companies with <100 employees, or in blue-collar jobs, was higher among women than men.

Table 2 shows the relationships between study variables and the experience of refraining from seeking medical services, by sex. For men, factors associated with refraining from seeking medical care included being married, having lower educational attainment, higher income, and poorer subjective health, and being a current smoker, being alcoholic, having lower health literacy, higher job stress, and working in companies with <100 employees and in blue-collar jobs. For women, these variables were physical inactivity, being a current smoker, having low health literacy, and being employed in blue-collar jobs.

Table 3 shows the Poisson regression [PR] and 95% confidence interval [CI] for refraining from seeking medical services, by sex, using multivariate Poisson regression analysis. Among male workers, those in companies with <100 employees were more likely to refrain from seeking medical services than were those in larger companies (PR: 1.19 95% CI: 1.04-1.37). Significantly increased PRs were also observed for poor self-rated health, current smoking, and working >40 hours/wk. Among female workers, those who were self-employed (PR: 1.38, 95% CI: 1.08-1.77) or had blue-collar status (PR: 1.24, 95% CI: 1.04-1.47) were more likely to refrain. Significantly increased PRs were also observed for those with low health literacy.

Discussion

We found that 985 (48.9%) working adults had refrained from seeking medical services, and among men this was associated with company size, while employment type and occupation type were the relevant factors among women.

Men working in small companies were more likely to

refrain from seeking medical services (PR: 1.19, 95% CI: 1.04-1.37) than were those working in medium or large companies. We considered the placement status of occupational physicians as a possible factor underlying this phenomenon. Under present Japanese labor law, worksites with <50 employees do not typically need to appoint occupational physicians. Although response options regarding company size did not exactly match the categories, the effect of limited access to occupational physicians may be reflected in the results. Generally, Japanese employees in large companies earn higher wages and have better job security, because of lifetime employment, compared with those in smaller companies²⁵). Inevitably, smaller companies spend less time on worksite health promotion activities²⁶). Workers in larger companies can more easily take days off and are more likely to visit a doctor than are those in smaller companies^{27,28}). Regarding company size, there was no clear tendency among women. A sex difference was seen in company size, because the sample size of women working in large companies was limited, and working conditions as a function of company size may differ between men and women.

Self-employed status (PR: 1.38, 95% CI: 1.08-1.77), compared with other kinds of employment, had a stronger association with refraining from seeking medical services among women. A previous study in Japan suggested that working conditions could improve chances of visiting a doctor. These conditions include flexibility of work schedule, autonomy at work, and shorter working hours²⁹). Another study found that self-employed women in Japan often work in family businesses and may not have the job control or autonomy their male counterparts have³⁰). Because of comparably less flexibility and autonomy in the work setting, self-employed female workers may tend to refrain from seeking medical services. Appendix Table 1 shows that male self-employed status interacted significantly with self-rated health (PR: 1.41, 95% CI: 1.04-1.91). Self-employed male workers may also tend to refrain from seeking medical services when their health status is poor.

The analysis also indicated that, among women, blue-collar workers were more likely to refrain from seeking medical services (PR: 1.24, 95% CI: 1.04-1.47) than were their white-collar counterparts. Previous studies have shown that blue-collar workers have a higher prevalence of poor self-rated health³¹) and health complaints³²) than do white-collar workers. Additionally, female workers suffer from more physical and mental health problems caused by specific illnesses, such as menstrual pain³²). Although there are some special forms of employment leave legally recognized for female workers in Japan, it has been found that because of Japanese business culture, most women opt to endure the problem rather than taking leave³³). Female blue-collar workers, who work on a fixed schedule, may have less control over their work time. In the context

Table 1. Basic characteristics of the study sample (n=2,013)

	Men		Women		P
	n	%	n	%	
Age					0.007**
25-29	183	15.8%	181	21.1%	
30-39	454	39.3%	302	35.2%	
40-50	519	44.9%	374	43.6%	
Marital status					<0.001***
Married	851	73.6%	547	63.8%	
Not married	305	26.4%	310	36.2%	
Household members					<0.001***
1	131	11.3%	54	6.3%	
2	214	18.5%	181	21.1%	
≥3	811	70.2%	622	72.6%	
Educational attainment					<0.001***
High school graduate or less	475	41.1%	537	62.7%	
2-year college graduate or higher	681	58.9%	320	37.3%	
Equivalent annual household income (JPY)					<0.001***
<2.5 million	226	19.6%	237	27.7%	
2.5-3.5 million	265	22.9%	201	23.5%	
3.5-5.05 million	317	27.4%	189	22.1%	
>5.05 million	348	30.1%	230	26.8%	
Self-rated health					0.023*
Good	1,047	90.6%	749	87.4%	
Bad	109	9.4%	108	12.6%	
Physical activity					0.128
Physically active	191	16.5%	164	19.1%	
Physically inactive	965	83.5%	693	80.9%	
Smoking status					<0.001***
Non-smoker	759	65.7%	736	85.9%	
Smoker	397	34.3%	121	14.1%	
Alcoholic status					<0.001***
Non-alcoholic	1,079	93.3%	844	98.5%	
Alcoholic (CAGE score ≥2)	77	6.7%	13	1.5%	
Working hours/wk					<0.001***
≤40	415	35.9%	581	67.8%	
>40	741	64.1%	276	32.2%	
Job stress					0.521
Low job stress	798	69.0%	603	70.4%	
High job stress	358	31.0%	254	29.6%	
Health literacy					0.103
High (≥4)	491	42.5%	333	38.9%	
Low (<4)	665	57.5%	524	61.1%	
Employment type					<0.001***
Permanent	1,004	86.9%	388	45.3%	
Temporary	77	6.7%	414	48.3%	
Self-employed	75	6.5%	55	6.4%	
Company size (employees)					<0.001***
Large (>1,000)	471	40.7%	249	29.1%	
Medium (100-1,000)	277	24.0%	208	24.3%	
Small (<100)	408	35.3%	400	46.7%	
Occupation type					<0.001***
White collar	947	81.9%	765	89.3%	
Blue collar	209	18.1%	92	10.7%	
Refraining from seeking medical service					0.599
Yes	562	48.6%	423	49.4%	
No	520	45.0%	371	43.3%	
Not sick or injured	74	6.4%	63	7.4%	

Results of chi-squared test are shown. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 2. Relationships between study variables and refraining from seeking medical services (n=1,876)

Refrained from seeking medical services	Men					Women				
	Yes (n=562)		No (n=520)		χ^2 <i>p</i>	Yes (n=423)		No (n=371)		χ^2 <i>p</i>
	n	%	n	%		n	%	n	%	
Age										
25-29	97	17.3%	70	13.5%	0.146	94	22.2%	74	19.9%	0.242
30-39	225	40.0%	204	39.2%		158	37.4%	125	33.7%	
40-50	240	42.7%	246	47.3%		171	40.4%	172	46.4%	
Marital status										
Married	431	76.7%	366	70.4%	0.019*	265	62.6%	240	64.7%	0.550
Not married	131	23.3%	154	29.6%		158	37.4%	131	35.3%	
Household members										
1	51	9.1%	67	12.9%	0.09	30	7.1%	21	5.7%	0.187
2	101	18.0%	100	19.2%		77	18.2%	86	23.2%	
≥3	410	73.0%	353	67.9%		316	74.7%	264	71.2%	
Educational attainment										
High school graduate or less	245	43.6%	193	37.1%	0.030*	276	65.2%	221	59.6%	0.099
2-year college graduate or higher	317	56.4%	327	62.9%		147	34.8%	150	40.4%	
Equivalent annual household income (JPY)										
<2.5 million	127	22.6%	84	16.2%	<0.001***	126	29.8%	98	26.4%	0.502
2.5-3.5 million	149	26.5%	105	20.2%		102	24.1%	83	22.4%	
3.5-5.05 million	159	28.3%	139	26.7%		91	21.5%	84	22.6%	
>5.05 million	127	22.6%	192	36.9%		104	24.6%	106	28.6%	
Self-rated health										
Good	494	87.9%	481	92.5%	0.011*	362	85.6%	328	88.4%	0.238
Bad	68	12.1%	39	7.5%		61	14.4%	43	11.6%	
Physical activity										
Physically active	83	14.8%	97	18.7%	0.086	66	15.6%	80	21.6%	0.031*
Physically inactive	479	85.2%	423	81.3%		357	84.4%	291	78.4%	
Smoking status										
Non-smoker	345	61.4%	366	70.4%	0.002**	353	83.5%	328	88.4%	0.046*
Smoker	217	38.6%	154	29.6%		70	16.5%	43	11.6%	
Alcoholic status										
Non-alcoholic	515	91.6%	494	95.0%	0.028*	418	98.8%	366	98.7%	0.835
Alcoholic (CAGE score ≥2)	47	8.4%	26	5.0%		5	1.2%	5	1.3%	
Working hours/wk										
≤40	186	33.1%	208	40.0%	0.018*	280	66.2%	254	68.5%	0.497
>40	376	66.9%	312	60.0%		143	33.8%	117	31.5%	
Job stress										
Low job stress	366	65.1%	380	73.1%	0.005**	286	67.6%	271	73.0%	0.095
High job stress	196	34.9%	140	26.9%		137	32.4%	100	27.0%	
Health literacy										
High (≥4)	221	39.3%	238	45.8%	0.032*	148	35.0%	164	44.2%	0.008**
Low (<4)	341	60.7%	282	54.2%		275	65.0%	207	55.8%	
Employment type										
Permanent	485	86.3%	458	88.1%	0.360	181	42.8%	175	47.2%	0.165
Temporary	36	6.4%	35	6.7%		209	49.4%	178	48.0%	
Self-employed	41	7.3%	27	5.2%		33	7.8%	18	4.9%	
Company size (employees)										
Large (>1,000)	205	36.5%	235	45.2%	0.001***	121	28.6%	113	30.5%	0.152
Medium (100-1,000)	130	23.1%	133	25.6%		90	21.3%	96	25.9%	
Small (<100)	227	40.4%	152	29.2%		212	50.1%	162	43.7%	
Occupation type										
White collar	443	78.8%	445	85.6%	0.004**	367	86.8%	343	92.5%	0.009**
Blue collar	119	21.2%	75	14.4%		56	13.2%	28	7.5%	

Results of chi-squared test are shown. **p*<0.05; ***p*<0.01; ****p*<0.001

Table 3. Poisson regression analyses of the relationships between study variables and refraining from seeking medical services (n=1,876)

Variables	Model 1		Model 2		Model 3					
	Multivariate-adjusted (PR 95% CI)	Men (n=1,082)	Multivariate-adjusted (PR 95% CI)	Men (n=1,082)	Multivariate-adjusted (PR 95% CI)	Men (n=1,082)	Multivariate-adjusted (PR 95% CI)	Women (n=794)	Multivariate-adjusted (PR 95% CI)	Women (n=794)
Employment type										
Permanent	1.00		1.00		1.00		1.00		1.00	
Temporary	0.95 (0.74-1.21)	1.13 (0.97-1.33)								
Self-employed	1.14 (0.93-1.39)	1.38 (1.08-1.77)								
Company size (employees)			1.00		1.00		1.00		1.00	
Large (>1,000)					1.02 (0.87-1.19)		0.92 (0.76-1.12)			
Medium (100-1,000)					1.19 (1.04-1.37)		1.09 (0.93-1.27)			
Small (<100)										
Occupation type										
White collar									1.00	1.00
Blue collar									1.05 (0.91-1.22)	1.24 (1.04-1.47)
Age										
25-29	1.00		1.00		1.00		1.00		1.00	
30-39	0.85 (0.73-1.01)	0.94 (0.79-1.13)			0.86 (0.73-1.01)		0.96 (0.80-1.14)		0.87 (0.73-1.02)	0.96 (0.81-1.14)
40-50	0.82 (0.69-0.98)	0.81 (0.66-0.99)			0.83 (0.69-0.98)		0.84 (0.69-1.02)		0.83 (0.70-0.99)	0.85 (0.70-1.04)
Marital status										
Married	1.00		1.00		1.00		1.00		1.00	1.00
Not married	0.75 (0.63-0.89)	1.00 (0.84-1.19)			0.74 (0.62-0.87)		0.98 (0.83-1.16)		0.75 (0.63-0.89)	0.96 (0.81-1.14)
Household members										
1	1.00		1.00		1.00		1.00		1.00	1.00
2	0.96 (0.73-1.27)	0.78 (0.58-1.05)			0.96 (0.73-1.27)		0.78 (0.58-1.04)		0.97 (0.73-1.28)	0.78 (0.58-1.04)
≥3	0.98 (0.76-1.25)	0.89 (0.69-1.15)			0.99 (0.77-1.26)		0.88 (0.68-1.14)		0.98 (0.77-1.25)	0.89 (0.69-1.15)
Educational attainment										
High school graduate or less	1.00		1.00		1.00		1.00		1.00	1.00
2-year college graduate or higher	0.99 (0.88-1.11)	0.91 (0.78-1.05)			1.01 (0.90-1.13)		0.91 (0.78-1.06)		1.00 (0.88-1.13)	0.92 (0.79-1.07)
Equivalent annual household income (JPY)										
<2.5 million	1.00		1.00		1.00		1.00		1.00	1.00
2.5-3.5 million	0.95 (0.81-1.10)	1.09 (0.91-1.31)			0.98 (0.84-1.14)		1.05 (0.88-1.26)		0.94 (0.81-1.10)	1.05 (0.87-1.25)
3.5-5.05 million	0.86 (0.73-1.01)	1.06 (0.86-1.30)			0.91 (0.77-1.07)		1.03 (0.84-1.26)		0.86 (0.74-1.01)	1.01 (0.83-1.24)
>5.05 million	0.66 (0.54-0.81)	1.08 (0.87-1.35)			0.71 (0.58-0.86)		1.03 (0.83-1.26)		0.66 (0.55-0.81)	1.02 (0.83-1.25)

Table 3. Poisson regression analyses of the relationships between study variables and refraining from seeking medical services (n=1,876) (continued)

Variables	Model 1		Model 2		Model 3	
	Multivariate-adjusted (PR 95% CI)		Multivariate-adjusted (PR 95% CI)		Multivariate-adjusted (PR 95% CI)	
	Men (n=1,082)	Women (n=794)	Men (n=1,082)	Women (n=794)	Men (n=1,082)	Women (n=794)
Self-rated health						
Good	1.00	1.00	1.00	1.00	1.00	1.00
Bad	1.21 (1.03-2.41)	1.07 (0.89-1.28)	1.19 (1.02-1.39)	1.07 (0.90-1.29)	1.20 (1.02-1.40)	1.05 (0.88-1.26)
Physical activity						
Active	1.00	1.00	1.00	1.00	1.00	1.00
Inactive	1.09 (0.92-1.29)	1.19 (0.98-1.44)	1.10 (0.93-1.30)	1.18 (0.98-1.43)	1.09 (0.92-1.29)	1.20 (0.99-1.45)
Smoking status						
Non-smoker	1.00	1.00	1.00	1.00	1.00	1.00
Smoker	1.14 (1.01-1.28)	1.15 (0.97-1.36)	1.12 (0.99-1.25)	1.14 (0.96-1.34)	1.13 (1.01-1.27)	1.15 (0.97-1.36)
Alcoholic status						
Non-alcoholic	1.00	1.00	1.00	1.00	1.00	1.00
Alcoholic (CAGE score ≥2)	1.19 (0.99-1.43)	0.97 (0.55-1.71)	1.18 (0.99-1.42)	0.99 (0.57-1.74)	1.20 (1.00-1.43)	0.98 (0.55-1.74)
Working hours/wk						
≤40	1.00	1.00	1.00	1.00	1.00	1.00
>40	1.16 (1.03-1.32)	1.05 (0.91-1.21)	1.17 (1.03-1.32)	1.03 (0.89-1.18)	1.17 (1.03-1.32)	1.03 (0.90-1.18)
Job stress						
Low job stress	1.00	1.00	1.00	1.00	1.00	1.00
High job stress	1.11 (0.99-1.24)	1.09 (0.95-1.26)	1.11 (0.99-1.25)	1.07 (0.93-1.23)	1.10 (0.98-1.23)	1.05 (0.91-1.21)
Health literacy						
High (≥4)	1.00	1.00	1.00	1.00	1.00	1.00
Low (<4)	1.04 (0.92-1.17)	1.16 (1.01-1.34)	1.05 (0.93-1.18)	1.16 (1.01-1.34)	1.04 (0.92-1.17)	1.15 (1.00-1.33)
Mean VIF	1.13	1.19	1.15	1.14	1.15	1.14

Robust generalized linear model, PR: Prevalence ratio, CI: Confidence interval

of Japanese business culture, a female blue-collar worker facing the dilemma of whether to take leave for visiting a doctor may be more likely to refrain from seeking medical services.

The strength of the present study is that we directly analyzed the factors associate with refraining from seeking medical services, rather than those related to access to medical services. This made the barriers to health-care-seeking behaviors clearer. To the best of our knowledge, the present study is the first to identify, by sex, working conditions related to refraining from seeking medical services.

However, the present study also had several limitations. First, the response rate was only 31.5%. Despite this, respondents to J-SHINE were comparable with the general population of the 2010 Japan Census in terms of sex, age, and educational attainment²⁰. With the exception of the “not sick/injured” category, significant results in the analyses without imputation and with multiple imputations for missing data on income remained the same (Appendix Table 2). Second, the degree of illness experienced by people who refrained from seeking medical services was unclear. Depression/mental disorder and migraine were more commonly seen as self-reported comorbidities among women who refrained from seeking medical services (Appendix Table 3). Third, the study was cross-sectional, so no causal interpretations can be made. Fourth, data on refraining from seeking medical services were collected through self-reports, which may introduce bias, although it is difficult to know the direction of this bias. Fifth, the study was based on a survey of metropolitan residents, which might restrict the generalizability of the results. Finally, although we adjusted variables for a variety of confounders, there may be relevant unadjusted factors such as personality traits, other occupation-related factors, or any manner of other unknown factors (Appendix Table 4). Further research with diverse population samples and refined measurement of labor factors and the behaviors associated with refraining from seeking medical services are needed.

Conclusions

This study suggests that the relationship between labor factors and the experience of refraining from seeking medical services differs by company size among men and by employment type and occupation type among women. Labor factors certainly appear to play a role in workers' decisions to seek medical services.

Acknowledgments: We wish to thank Dr. Misato Takada, Dr. Naoki Kondo, and Dr. Hideki Hashimoto for assistance with data management related to the J-SHINE project.

Conflict of interest: There are no conflict of interest to declare.

References

- 1) Lee SL, Hashimoto H, Kohro T, et al. Influence of municipality-level mean income on access to aortic valve surgery: A cross-sectional observational study under Japan's universal health-care coverage. *PLoS One* 2014; 9: e111071 (doi: 10.1371/journal.pone.0111071).
- 2) National Center for Health Statistics. Health Insurance and Access to Care. [Online]. 2012. 11. 1-2. Available from: URL: http://www.cdc.gov/nchs/data/factsheets/factsheet_hiac.pdf
- 3) Braveman PA, Egerter SA, Cubbin C, Marchi KS. An approach to studying social disparities in health and health care. *Am J Public Health* 2004; 94: 2139-2148.
- 4) Wamala S, Merlo J, Boström G, Hogstedt C. Perceived discrimination, socioeconomic disadvantage and refraining from seeking medical treatment in Sweden. *J Epidemiol Community Health* 2007; 61: 409-415.
- 5) Higashi K, Itoh M, Toyokawa S, Kobayashi Y. Subsidy and parental attitudes toward pediatric health care in the Tokyo metropolitan area. *Pediatr Int* 2016; 58: 132-138.
- 6) Bird ST, Bogart LM. Perceived race-based and socioeconomic status (SES)-based discrimination in interactions with health care providers. *Ethn Dis* 2001; 11: 554-563 [cited 2016 Jul 28].
- 7) Field KS, Briggs DJ. Socio-economic and locational determinants of accessibility and utilization of primary health-care. *Heal Soc Care Community* 2001; 9: 294-308.
- 8) Burström B. Increasing inequalities in health care utilisation across income groups in Sweden during the 1990s? *Health Policy (New York)* 2002; 62: 117-129.
- 9) Fujita M, Sato Y, Nagashima K, Takahashi S, Hata A. Income Related Inequality of Health Care Access in Japan: A Retrospective Cohort Study. *PLoS One* 2016; 11: e0151690.
- 10) Åhs AMH, Westerling R. Health care utilization among persons who are unemployed or outside the labour force. *Health Policy (New York)* 2006; 78: 178-193.
- 11) Baker D, Mead N, Campbell S. Inequalities in morbidity and consulting behaviour for socially vulnerable groups. *Br J Gen Pract* 2002; 52: 124-130.
- 12) Åhs A, Burell G, Westerling R. Care or not care-that is the question: Predictors of healthcare utilisation in relation to employment status. *Int J Behav Med* 2012; 19: 29-38.
- 13) Molarius A, Simonsson B, Linden-Bostrom M, Kalander-Blomqvist M, Feldman I, Eriksson HG. Social inequalities in self-reported refraining from health care due to financial reasons in Sweden: health care on equal terms? *BMC Health Serv Res* 2014; 14: 605.
- 14) Toyokawa S, Murakami K, Kaneto C, Kobayashi Y. Access to health care and horizontal equity. *Iryo to Shakai* 2012; 22: 69-78 (in Japanese).
- 15) Mizuochi M. Social capital and refraining from medical care among elderly people in Japan. *BMC Health Serv Res* 2016; 16: 331.

- 16) Ministry of Health, Labour and Welfare. Annual Health, Labour and Welfare Report 2011-2012. [Online]. 2012. 28-101. [cited 2016 Jul.]; Available from: URL: <http://www.mhlw.go.jp/english/wp/wp-hw6/dl/02e.pdf>
- 17) Public Survey on Healthcare in Japan. [Online]. 2013. Available from: URL: http://www.hgpi.org/report_events.html?article=258 (in Japanese).
- 18) Lee SY, Kim CW, Kang JH, Seo NK. Unmet healthcare needs depending on employment status. *Health Policy* 2015; 119: 899-906.
- 19) Inoue A, Kawakami N, Tsuchiya M, Sakurai K, Hashimoto H. Association of occupation, employment contract, and company size with mental health in a national representative sample of employees in Japan. *J Occup Health* 2010; 52: 227-240.
- 20) Takada M, Kondo N, Hashimoto H. Japanese study on stratification, health, income, and neighborhood: study protocol and profiles of participants. *J Epidemiol* 2014; 24: 334-344.
- 21) National Health and Nutrition Survey in Japan. Ministry of Health, Labour and Welfare; 2014. [Online]. Available from: URL: <http://www.mhlw.go.jp/file/04-Houdouhappyou-10904750-Kenkoukyoku-Gantaisakukenkouzoushinka/0000117311.pdf>
- 22) Toru T, Aida J, Kawachi I, Kazuo K, Ken O. Early life-course socioeconomic position, adult work-related factors and oral health disparities: cross-sectional analysis of the J-SHINE study. *BMJ Open* 2014; 4: 1-9 [cited 2015 Aug 31].
- 23) Inoue A, Kawakami N, Shimomitsu T, et al. Development of a Short Questionnaire to Measure an Extended Set of Job Demands, Job Resources, and Positive Health Outcomes: The New Brief Job Stress Questionnaire. *Ind Health* 2014; 175-189.
- 24) Furuya Y, Kondo N, Yamagata Z, Hashimoto H. Health literacy, socioeconomic status and self-rated health in Japan. *Health Promot Int* 2015; 30: 505-513.
- 25) Hirakubo N. The end of lifetime employment in Japan. *Bus Horiz* 1999; 42: 41-46.
- 26) Muto T. Public health. Tokyo (Japan): Occupational health; 2014. p. 237-251 (in Japanese).
- 27) Ministry of Health, Labour and Welfare. Annual Health, Labour and Welfare report 2014. [Online]. Available from: URL: <http://www.mhlw.go.jp/toukei/itiran/roudou/jikan/syurou/14/gaiyou01.html>
- 28) Tsuda K, Tsutsumi A, Kawakami N. Work-related factors associated with visiting a doctor for a medical diagnosis after a worksite screening for diabetes mellitus in Japanese male employees. *J Occup Health* 2004; 46: 374-381.
- 29) Inoue M, Tsurugano S, Nishikitani M, Yano E. Full-time workers with precarious employment face lower protection for receiving annual health check-ups. *Am J Ind Med* 2012; 55: 884-892.
- 30) Brinton MC. Women and the Economic Miracle: Gender and work in postwar Japan. Berkeley and Los Angeles, CA: University of California Press; 1993.
- 31) Martikainen P, Lahelma E, Marmot M, Sekine M, Nishi N, Kagamimori S. A comparison of socioeconomic differences in physical functioning and perceived health among male and female employees in Britain, Finland and Japan. *Soc Sci Med* 2004; 59: 1287-1295.
- 32) Ohta A, Takeuchi K, Yosiaki S, Suzuki S. Differences in lifestyle and perceived health in different occupations in a community. *J Occup Health* 1998; 40: 325-333.
- 33) Taketani Y. The health of women in labour. Tokyo (Japan): The Occupational Health Promotion Foundation; 2015. p. 1-21 (in Japanese).

Journal of Occupational Health is an Open Access article distributed under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. To view the details of this license, please visit (<https://creativecommons.org/licenses/by-nc-sa/4.0/>).