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)
izes for financial reasons. This statistic underscores the role of economic power in accounting for differences in accessibility of health care. Restriction of access to medical services in Japan has recently been taken up as an important issue in need of attention.

Most existing research about refraining from seeking medical services has focused on unemployed, rather than employed people. 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 treatment. 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 Japan. 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 elsewhere. 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 activity (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 (summed scores from the seven items were divided into tertiles, with the third tertile defined as “high job stress”); health literacy (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 equivalized household income computed as the square root of the number of household members. For the analysis, equivalized 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 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-
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, workplaces 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 companies.

Inevitably, workers in larger companies can more easily take days off and are more likely to visit a doctor than are those in smaller companies. 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 hours. 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 have. Because of comparably less flexibility and autonomy in the work setting, self-employed female workers may 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 health and health complaints than do white-collar workers. Additionally, female workers suffer from more physical and mental health problems caused by specific illnesses, such as menstrual pain. 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 leave. Female blue-collar workers, who work on a fixed schedule, may have less control over their work time. In the context

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% of 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 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, workplaces 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 companies. Inevitably, smaller companies spend less time on worksite health promotion activities. Workers in larger companies can more easily take days off and are more likely to visit a doctor than are those in smaller companies. 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.

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

|                          | Men     | Women    | P     |
|--------------------------|---------|----------|-------|
|                          | n      | %       | n      | %       |
| Agé                       |        |         |        |         |
| 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           |        |         |        |         |
| Married                  | 851    | 73.6%   | 547    | 63.8%   |
| Not married              | 305    | 26.4%   | 310    | 36.2%   |
| Household members        | <0.001*** | <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*** | <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*** | <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*** | <0.001*** |       |
| Non-smoker               | 759    | 65.7%   | 736    | 85.9%   |
| Smoker                   | 397    | 34.3%   | 121    | 14.1%   |
| Alcoholic status         | <0.001*** | <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*** | <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*** | <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*** | <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*** | <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 (n=562) | Women (n=423) | Women (n=371) |
|----------------------------------------|-------------|----------------|---------------|
|                                        | Yes | No | p   | Yes | No | p   | p   |
| Age 25-29                              | 97  | 70 | 13.5% | 94  | 74 | 19.9% | 0.242 |
| 30-39                                  | 225 | 204 | 39.2% | 158 | 125 | 33.7% | 0.550 |
| 40-50                                  | 240 | 246 | 47.3% | 171 | 172 | 46.4% | 0.550 |
| Marital status                         |      |    |      |      |    |      |      |
| Married                                | 431 | 366 | 70.4% | 265 | 240 | 64.7% | 0.550 |
| Not married                            | 131 | 154 | 29.6% | 158 | 172 | 35.3% | 0.550 |
| Household members                      |      |    |      |      |    |      |      |
| 1                                      | 51  | 67 | 12.9% | 30  | 21 | 5.7%  | 0.187 |
| 2                                      | 101 | 100 | 19.2% | 77  | 86 | 23.2% | 0.187 |
| ≥3                                     | 410 | 353 | 67.9% | 316 | 264 | 71.2% | 0.187 |
| Educational attainment                 |      |    |      |      |    |      |      |
| High school graduate or less           | 245 | 193 | 37.1% | 276 | 221 | 59.6% | 0.099 |
| 2-year college graduate or higher      | 317 | 327 | 62.9% | 147 | 150 | 40.4% | 0.238 |
| Equivalent annual household income (JPY) |      |    |      |      |    |      |      |
| <2.5 million                           | 127 | 84 | 16.2% | 126 | 98 | 26.4% | 0.002 **|
| 2.5-3.5 million                        | 149 | 105 | 20.2% | 102 | 83 | 22.4% | 0.502 |
| 3.5-5.05 million                       | 159 | 139 | 26.7% | 91  | 84 | 22.6% | 0.502 |
| ≥5.05 million                          | 127 | 192 | 36.9% | 104 | 106 | 28.6% | 0.502 |
| Self-rated health                      |      |    |      |      |    |      |      |
| Good                                   | 494 | 481 | 92.5% | 362 | 328 | 88.4% | 0.238 |
| Bad                                    | 68  | 39 | 7.5%  | 61  | 43 | 11.6% | 0.238 |
| Physical activity                      |      |    |      |      |    |      |      |
| Physically active                      | 83  | 97 | 18.7% | 66  | 80 | 21.6% | 0.031 *|
| Physically inactive                    | 479 | 423 | 81.3% | 357 | 291 | 78.4% | 0.031 *|
| Smoking status                         |      |    |      |      |    |      |      |
| Non-smoker                             | 345 | 366 | 70.4% | 353 | 328 | 88.4% | 0.464 *|
| Smoker                                 | 217 | 154 | 29.6% | 70  | 43 | 11.6% | 0.464 *|
| Alcoholic status                       |      |    |      |      |    |      |      |
| Non-alcoholic                          | 515 | 494 | 95.0% | 418 | 366 | 98.7% | 0.835 |
| Alcoholic (CAGE score ≥2)              | 47  | 26 | 5.0%  | 5   | 5  | 1.3%  | 0.835 |
| Working hours/wk                       |      |    |      |      |    |      |      |
| ≤40                                    | 186 | 208 | 40.0% | 280 | 254 | 68.5% | 0.497 |
| >40                                    | 376 | 312 | 60.0% | 143 | 117 | 31.5% | 0.497 |
| Job stress                             |      |    |      |      |    |      |      |
| Low job stress                         | 366 | 380 | 73.1% | 286 | 271 | 73.0% | 0.095 |
| High job stress                        | 196 | 140 | 26.9% | 137 | 100 | 27.0% | 0.095 |
| Health literacy                        |      |    |      |      |    |      |      |
| High (≥4)                              | 221 | 238 | 45.8% | 148 | 164 | 44.2% | 0.008 **|
| Low (<4)                               | 341 | 282 | 54.2% | 275 | 207 | 55.8% | 0.008 **|
| Employment type                        |      |    |      |      |    |      |      |
| Permanent                              | 485 | 458 | 88.1% | 181 | 175 | 47.2% | 0.165 |
| Temporary                              | 36  | 35 | 6.4%  | 209 | 178 | 48.0% | 0.165 |
| Self-employed                          | 41  | 27 | 7.3%  | 33  | 18 | 4.9%  | 0.165 |
| Company size (employees)               |      |    |      |      |    |      |      |
| Large (>1,000)                         | 205 | 235 | 45.2% | 121 | 113 | 30.5% | 0.152 |
| Medium (100-1,000)                     | 130 | 133 | 25.6% | 90  | 96  | 25.9% | 0.152 |
| Small (<100)                           | 227 | 152 | 29.2% | 212 | 162 | 43.7% | 0.152 |
| Occupation type                        |      |    |      |      |    |      |      |
| White collar                           | 443 | 445 | 85.6% | 367 | 343 | 92.5% | 0.009 **|
| Blue collar                            | 119 | 75  | 14.4% | 56  | 28  | 7.5%  | 0.009 **|

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)        | 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)                            |
| Employment type                              |                                          |                                          |                                          |
| Permanent                                    | 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)                     |                                          |                                          |                                          |
| Large (>1,000)                               |                                          | 1.00                                     | 1.00                                     |
| Medium (100-1,000)                           |                                          | 1.02 (0.87-1.19)                         | 0.92 (0.76-1.12)                         |
| Small (<100)                                 |                                          | 1.19 (1.04-1.37)                         | 1.09 (0.93-1.27)                         |
| Occupation type                              |                                          |                                          |                                          |
| White collar                                 |                                          |                                          |                                          |
| 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                                     | 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)                         |
| 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 associated 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 attainment. 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. 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. 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 produce 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. 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.

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