Survey on the Status of Smoking Inside Eating Establishments in the Cities of Kobe and Amagasaki

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**Background:** The Hyogo Prefectural Government has been enforcing a smoking ban ordinance since April 2013. The present survey was conducted to determine the extent to which the smoking ban has been successfully implemented in eating establishments in Kobe City and Amagasaki City.

**Methods and Results:** The Health and Welfare Department of the Hyogo Prefectural Government provided a list of eating establishments in Kobe and Amagasaki City. From these, we chose 1,300 from each city using random number generation. Responses were obtained from 310 establishments in Kobe City (response rate: 23.8%) and 297 in Amagasaki City (22.8%). Overall, 58.1% of the establishments surveyed in Kobe City were aware of the ordinance, a recognition rate significantly higher than that of Amagasaki City, where only 45.5% of eateries were aware of the ordinance (P=0.003). Of the Kobe City eateries, 31.7% had succeeded in implementing a complete ban on smoking. In Amagasaki City, the rate was significantly lower, at just 13.4% (P<0.001). A logistic regression analysis showed that coffee shops, Japanese-style taverns, bars, and eating establishments that served alcohol were the independent significant predictors of low compliance. Kobe City restaurants, women, and families were the independent significant predictors of high compliance with the complete smoking ban.

**Conclusions:** The rates of recognition and implementation of the complete smoking ban were significantly lower in Amagasaki City than in Kobe City. There needs to be a strong and continuous socialization campaign to promote the ordinance.

**Key Words:** Eateries; Ordinance; Secondhand smoke; Surveys; Tobacco

According to the World Health Organization (WHO) and the Japanese Ministry of Health, Labour, and Welfare, secondhand smoke (SHS) kills 0.6 million people annually worldwide (15,000 people in Japan); active smoking kills 5.4 million people (130,000 people in Japan). Epidemiological studies have shown that exposure to SHS has adverse effects on cardiovascular health. Although enacting legislation to ban smoking in public places reduces the incidence of coronary events by 8–17%, smoke-free legislation ranges from partial bans, where smoking is allowed in some public places (e.g., bars and/or restaurants), to comprehensive smoking bans, whereby smoking is banned in all public places and workplaces. The reduction in acute coronary syndrome (ACS) admissions was either lower or non-existent in locations that had only partial restrictions, in comparison with those that had implemented comprehensive bans.

Hyogo is the second prefecture in Japan to ban smoking in public places, after Kanagawa, although the ban is partial in restricted areas and separate smoking areas are permitted, resulting in an incomplete ban. In brief, the Hyogo Prefec-
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Survey participants were asked to return their questionnaires to the office of the secretariat within 1 month. No reminders were sent to non-responders. The study used an anonymous, questionnaire-based postal survey, which was approved by the Human Research Ethics Committee of Hyogo Prefectural Amagasaki Hospital. The collected data included background information on the eating establishments, smoking ban recognition rates, and information on eateries that had implemented a complete ban and the factors that had led them to do so. This information was designed to assist in implementing future policies (Appendix S1).

Statistical Analysis

The differences between Kobe and Amagasaki Cities were evaluated using Fisher’s exact test (binomial data) and the Wilcoxon rank-sum test (ordinal data). The factors related to ordinance recognition and the complete ban were evaluated using logistic regression analyses. We developed the following 2 logistic regression models: model 1, all covariances were evaluated; model 2, covariance with P<0.2 (other covariances were integrated) and the integration of more than 2 covariances, which approximated the odds ratio in model 1, were evaluated. All statistical analyses, including random number generation, were carried out using R 3.3.1 software (R Foundation for Statistical Computing in Vienna, Austria). Significance was defined as P<0.05 for all tests and variables.

Results

Responses were obtained from 310 establishments in Kobe other districts in Hyogo. However, cases of unstable angina increased in other areas after the implementation of the Hyogo Prefecture smoking ban. These results suggest that the fall in the number of ACS cases may reflect the degree of adherence to the smoking ban in the area. In our previous report, Kobe City experienced the largest decrease in ACS cases, and Amagasaki City showed the largest increase (data not shown), following the implementation of a partial smoking ban ordinance. For this reason, we have chosen to compare the status of smoking inside eating establishments in these 2 cities (according to the Statistics Bureau, Ministry of Internal Affairs and Communications, the population, taxable profits, and number of unemployed people in Kobe and Amagasaki Cities are 1,537,000 and 452,000 people, 2,311 and 603 billion yen, and 50,000 and 16,000 people, respectively). This study investigates the extent to which the smoking ban has been successfully implemented in eating establishments in Kobe City and Amagasaki City.

Methods

From the Health and Welfare Department of the Hyogo Prefectural Government, we received a list of 17,772 eating establishments in Kobe City and 4,444 in Amagasaki City. We eliminated convenience stores and open space restaurants from the list and selected 14,973 eateries in Kobe City and 3,726 in Amagasaki City as potential candidates for our survey. From these establishments, we selected 1,300 from each city through uniformly distributed random number generation; questionnaires were mailed in February 2017. We requested that the questionnaires be responded to by the owner or manager of each establishment. Survey participants were asked to return their questionnaires to the office of the secretariat within 1 month. No reminders were sent to non-responders. The study used an anonymous, questionnaire-based postal survey, which was approved by the Human Research Ethics Committee of Hyogo Prefectural Amagasaki Hospital. The collected data included background information on the eating establishments, smoking ban recognition rates, and information on eateries that had implemented a complete ban and the factors that had led them to do so. This information was designed to assist in implementing future policies (Appendix S1).

Table 1. Basic Demographic Data for Eating Establishments in Kobe and Amagasaki

| Category                        | Kobe City (n=289) | Amagasaki City (n=288) | P value |
|--------------------------------|------------------|------------------------|--------|
| Japanese restaurant            | 27 (9.3)         | 25 (8.7)               | 0.114† |
| Western-style restaurant       | 30 (10.4)        | 19 (6.6)               |        |
| Chinese restaurant             | 29 (10.0)        | 17 (5.9)               |        |
| General restaurant             | 15 (5.2)         | 13 (4.5)               |        |
| Coffee shop                    | 58 (20.1)        | 62 (21.5)              |        |
| Japanese noodle (soba and udon)| 14 (4.8)         | 12 (4.2)               |        |
| Teppan-yaki shop (e.g., grilled meat) | 19 (6.6)     | 38 (13.2)              |        |
| Japanese-style tavern          | 61 (21.1)        | 68 (23.6)              |        |
| Bars                           | 36 (12.5)        | 34 (11.8)              |        |
| Main customers§                |                  |                        | 0.335† |
| Adult men                      | 44 (15.3)        | 42 (14.7)              |        |
| Adult women                    | 21 (7.3)         | 11 (3.8)               |        |
| Adults, both men and women     | 205 (71.2)       | 213 (74.5)             |        |
| Families including children    | 18 (6.2)         | 20 (7.0)               |        |
| Serving alcohol                | 251 (86.9)       | 241 (83.7)             | 0.292† |
| Floor area (m²)§§              |                  |                        | 0.008‖†,*|
| <25                            | 122 (44.7)       | 146 (53.7)             |        |
| —50                            | 99 (36.3)        | 96 (35.3)              |        |
| —75                            | 27 (9.9)         | 17 (6.2)               |        |
| —100                           | 14 (5.1)         | 8 (2.9)                |        |
| ≥100                           | 11 (4.0)         | 5 (1.8)                |        |

†Fisher’s exact test, ††Wilcoxon rank-sum test, *P<0.01. §One of Kobe City and 2 of Amagasaki City establishments were excluded because of missing data. §§16 of Kobe City and 16 of Amagasaki City establishments were excluded because of missing data.
City (response rate: 23.8%) and from 297 in Amagasaki City (response rate: 22.8%). From these, data were compiled on the respective 289 and 288 establishments that represented “survey target institutions.” Analyzing this basic information showed that eating establishments in Kobe City were no different from those in Amagasaki City when it came to their categories, main customers, or provision of alcohol. However, there were differences in floor area, with 11 establishments in Kobe and 5 in Amagasaki having >100 m² of floor area reserved for customers (Table 1).

Overall, 58.1% of the establishments surveyed in Kobe City were aware of the nonsmoking ordinance, a recognition rate that was significantly higher than for establishments in Amagasaki City, where only 45.5% expressed the same awareness (P<0.001). In Kobe City and Amagasaki City, establishments that were aware of the ordinance shared the same categories, main customers, alcohol service, and floor area (Table 2). A logistic regression analysis showed that Japanese noodle (soba and udon) restaurants, Japanese-style taverns, bars, and eating establishments that served alcohol were independent significant predictors of low compliance. Kobe City restaurants and eateries that catered to women and families were independent significant predictors of high compliance with a complete smoking ban (Table 4).

The reasons given for implementing a complete ban were as follows: company policy (27.0%); current trend (37.3%); customer request (23.0%); boost image (20.6%); consideration for customers’ health (33.3%); consideration employers’ and employees’ health (34.1%); legal requirement (14.3%). Of the owners and managers of restaurants that had implemented a complete smoking ban, 44.7% said there had been no change in the number of customers (other responses were as follows: increase 4.4%, decrease 14.0%, “don’t know” 36.8%).

Moreover, 56.6% of the owners or managers of restaurants that allowed smoking (58.7 (52.9+5.8) % in Kobe City and 55.0 (52.5+2.5) % in Amagasaki City (Table 5) believed that the current status of their own establishments was not adequate. Some were planning to change their

### Table 2. Demographic Data for Eating Establishments in Kobe and Amagasaki With Awareness of the 2013 Nonsmoking Ordinance and Those That Implemented Complete Smoking Ban

| Category                      | Awareness of the nonsmoking ordinance | Implementing complete smoking ban |
|-------------------------------|---------------------------------------|----------------------------------|
|                               | Kobe City 168 (58.1) | Amagasaki City 130 (45.1) | P value 0.003 0.208† | Kobe City 89 (30.8) | Amagasaki City 37 (12.8) | P value <0.001 0.763† |
| Japanese restaurant           | 18 (10.7)                | 14 (10.8)                | 12 (13.5)          | 6 (16.2)          |
| Western-style restaurant      | 20 (11.9)                | 10 (7.7)                 | 19 (21.3)          | 9 (24.3)          |
| Chinese restaurant            | 20 (11.9)                | 12 (9.2)                 | 10 (11.2)          | 2 (5.4)           |
| General restaurant            | 9 (5.4)                  | 5 (3.8)                  | 4 (4.5)            | 2 (5.4)           |
| Coffee shop                   | 40 (23.8)                | 31 (23.8)                | 26 (29.2)          | 9 (24.3)          |
| Japanese noodle (soba and udon) | 7 (4.2)                  | 4 (3.1)                  | 9 (10.1)           | 4 (10.8)          |
| Teppan-yaki shop (e.g., grilled meat) | 9 (5.4)                  | 20 (15.4)                | 6 (6.7)            | 4 (10.8)          |
| Japanese-style tavern         | 28 (16.7)                | 25 (19.2)                | 0 (0.0)            | 1 (2.7)           |
| Bars                          | 17 (10.1)                | 9 (6.9)                  | 3 (3.4)            | 0 (0.0)           |
| **Main customers**            |                         |                         | 0.060† 0.667†      |                         |                         |
| Adult men                     | 18 (10.7)                | 18 (14.1)                | 8 (9.0)            | 1 (2.7)           |
| Adult women                   | 16 (9.5)                 | 4 (3.1)                  | 15 (16.9)          | 6 (16.2)          |
| Adults, both men and women    | 123 (73.2)               | 91 (71.1)                | 55 (61.8)          | 24 (64.9)         |
| Families including children   | 11 (6.5)                 | 15 (11.7)                | 11 (12.4)          | 6 (16.2)          |
| **Serving alcohol**           |                         |                         | 0.285† 0.170†      |                         |                         |
| Floor area (m²)               |                         |                         |                      |                      |
| <25                           | 59 (38.1)                | 47 (39.5)                | 35 (42.2)          | 13 (38.2)         |
| 25–<50                        | 62 (40.0)                | 53 (44.5)                | 30 (36.1)          | 13 (38.2)         |
| 50–<75                        | 15 (9.7)                 | 11 (9.2)                 | 10 (12.0)          | 6 (17.6)          |
| 75–<100                       | 11 (7.1)                 | 4 (3.4)                  | 5 (6.0)            | 1 (2.9)           |
| ≥100                          | 8 (5.2)                  | 4 (3.4)                  | 3 (3.6)            | 1 (2.9)           |

†Fisher’s exact test, ††Wilcoxon signed-rank test.
policies. A total of 76.0% of the owners or managers of restaurants that currently allowed smoking, and who indicated that change would be difficult, said they were worried about losing customers (other responses included the following: not enough space (67.8%); too expensive (41.5%); requires negotiations with the landlord (13.7%).

**Discussion**

Hospitality workers are of particular interest in relation to smoking legislation. First, they are significantly more exposed to SHS than other occupational groups. Second, they must enforce the nonsmoking ban among customers, which necessarily restrict smoking in most hospitality industry establishments, such as restaurants. The smoking ban enacted in Hyogo Prefecture in 2013 excluded small restaurants, taverns and bars, among other venues, from the ban. In January 2006, Spain banned smoking in all indoor facilities, including smoking rooms, which are currently in place for almost 1.5 billion people in 55 countries. In Japan, the 2003 Health Promotion Act states that facility managers shall make efforts to prevent SHS. Internationally, as the WHO has shown, smoke-free legislation, including a penal code that completely bans smoking in every indoor facility, including those related to the hospitality industry, such as restaurants and bars, is standard. Comprehensive smoke-free legislation is currently in place for almost 1.5 billion people in 55 countries. In Japan, smoking is permitted in most areas, under the prevailing incomplete legislation. Furthermore, designated smoking (e.g., in smoking rooms) is permitted in most areas, under the prevailing incomplete ban. In January 2006, Spain banned smoking from all indoor workplaces, public places, and public transportation facilities, including enclosed stations, hospitals and other healthcare facilities, schools and universities, retail stores, and shopping centers. However, hospitality venues were subject to a partial ban only. Fernández et al reported that, at venues in Spain where smoking was completely prohibited, a significant reduction in the concentration of salivary cotinine (an alkaloid found in tobacco and a predominant

**Table 3. Predictors of Recognition of Smoking Ban Ordinance by Eating Establishments in Kobe and Amagasaki**

| Category                  | Recognition n (%) | Model 1 | Model 2 |
|---------------------------|-------------------|---------|---------|
|                           | OR [95% CI]       | P value | OR [95% CI] | P value |
| Amagasaki City            |                   |         |         |
| Japanese restaurant       | 0.4 [0.2–0.9]     | 0.044*  | 0.038*  |
| Western-style restaurant  | 0.6 [0.3–1.3]     | 0.198   | 0.044*  |
| Chinese restaurant        | 1.2 [0.5–3.0]     | 0.658   | 0.044*  |
| Coffee shop               | 0.6 [0.3–1.4]     | 0.264   | 0.044*  |
| General restaurant        | 0.5 [0.2–1.4]     | 0.176   | 0.06 [0.2–1.3] | 0.194 |
| Japanese noodle (soba and udon) | 0.4 [0.1–1.0] | 0.004*  | 0.044*  |
| Teppan-yaki shop (e.g., grilled meat) | 0.6 [0.3–1.3] | 0.198   | 0.044*  |
| Japanese-style tavern     | 0.4 [0.2–0.9]     | 0.016*  | 0.05 [0.3–0.8] | 0.003** |
| Bars                      | 0.4 [0.2–1.0]     | 0.046*  | 0.05 [0.3–0.9] | 0.024*  |

**Main customers**

| Floor area (m²) | n | Recognition n (%) | Model 1 | Model 2 |
|-----------------|---|-------------------|---------|---------|
|                 | n | OR [95% CI]       | P value | OR [95% CI] | P value |
| <25             | 266 | 105 (39.5) | 1.0 | 1.0 |
| 25–50           | 195 | 115 (59.0) | 2.1 [1.4–3.2] | <0.001*** | 2.1 [1.5–3.1] | <0.001*** |
| 50–<75          | 43  | 26 (60.5) | 1.8 [0.9–3.7] | 0.091† | 3.6 [1.6–8.1] | 0.002** |
| 75–<100         | 21  | 15 (71.4) | 3.5 [1.9–9.7] | 0.016* | 3.6 [1.6–8.1] | 0.002** |
| ≥100            | 16  | 12 (75.0) | 3.6 [1.1–12.0] | 0.041* | 3.6 [1.6–8.1] | 0.002** |

36 establishments were excluded because of missing data. Model 1: all target factors were included, Model 2: factors with P<0.2 in model 1 were included. †P<0.1, *P<0.05, **P<0.01, ***P<0.001. §Integrated more than 2 categories. CI, confidence interval; OR, odds ratio.
Survey of Smoking Ban Compliance in Kobe and Amagasaki

The Spanish Parliament passed a comprehensive smoking law amending and strengthening the ban in 2011. The amended law extended smoking restrictions to all hospitality premises and SHS exposure in hospitality venues dramatically decreased after that.

We recently reported on a significant decrease in the number of ACS admissions in Kobe City, when compared with other districts in Hyogo.

Table 4. Predictors of Implementation of Complete Smoking Ban by Eating Establishments in Kobe and Amagasaki

| Category                          | Osaka City |                                                                 | Model 1 |                                                                 | Model 2 |
|-----------------------------------|------------|------------------------------------------------------------------|---------|------------------------------------------------------------------|---------|
|                                   | n Complete smoking ban, n (%) |                                                                 | OR [95% CI] | P value OR [95% CI] | P value |
| Amagasaki City                    | 261 34 (13.0) | 1.0                                                                 | <0.001*** | 3.6 [2.1–6.1] | <0.001*** |
| Kobe City                         | 264 83 (31.4) | 3.6 [2.1–6.2]                                                                 | 0.255 | 1.0                                                                 |
| Category                          | n Complete smoking ban, n (%) |                                                                 | OR [95% CI] | P value OR [95% CI] | P value |
| Japanese restaurant               | 48 17 (35.4) | 1.0                                                                 | 0.255 | 1.0                  |
| Chinese restaurant                | 44 12 (27.3) | 0.6 [0.2–1.5]                                                                 | 0.255 | 1.0                  |
| Japanese noodle (soba and udon)   | 25 12 (48.0) | 2.0 [0.7–5.9]                                                                 | 0.219 | 1.0                  |
| General restaurant                | 25 5 (20.0)  | 0.4 [0.1–1.4]                                                                 | 0.150 | 0.4 [0.1–1.3] | 0.141  |
| Western-style restaurant          | 44 26 (59.1) | 2.1 [0.8–5.4]                                                                 | 0.070 | 2.3 [1.1–5.1] | 0.034*  |
| Coffee shop                       | 100 32 (32.0) | 0.3 [0.1–0.9]                                                                 | 0.039* | 0.4 [0.1–0.9] | 0.030*  |
| Teppan-yaki shop (e.g., grilled meat) | 52 9 (17.3)  | 0.4 [0.1–1.1]                                                                 | 0.083* | 0.5 [0.2–1.1] | 0.093*  |
| Japanese-style tavern             | 72 1 (0.8)   | 0.0 [0.0–0.1]                                                                 | <0.001*** | 0.0 [0.0–0.1] | <0.001*** |
| Bars                              | 64 3 (4.7)   | 0.1 [0.0–0.4]                                                                 | 0.000** | 0.1 [0.0–0.3] | <0.001*** |
| Main customers                     | n Complete smoking ban, n (%) |                                                                 | OR [95% CI] | P value OR [95% CI] | P value |
| Adult men                         | 78 8 (10.3)  | 1.0                                                                 | 0.293 | 1.0                  |
| Adults, both men and women        | 386 74 (19.2) | 1.6 [0.7–4.0]                                                                 | 0.000** | 1.0                  |
| Adult women                       | 28 20 (71.4) | 10 [9.3–38.4]                                                                 | <0.001*** | 7.0 [2.6–18.9] | <0.001*** |
| Families including children       | 33 15 (45.5) | 5.4 [1.6–18.0]                                                                 | 0.000** | 3.5 [1.5–8.4] | 0.004**  |
| Serving alcohol                   | 455 89 (19.6) | 0.3 [0.1–0.7]                                                                 | 0.010* | 0.3 [0.1–0.7] | 0.009**  |
| Floor area (m²)                   | n Complete smoking ban, n (%) |                                                                 | OR [95% CI] | P value OR [95% CI] | P value |
| <25                               | 255 48 (18.8) | 1.0                                                                 | 0.753 | 1.0                  |
| 25–<50                            | 191 43 (22.5) | 0.9 [0.5–1.6]                                                                 | 0.753 | 1.0                  |
| 50–<75                            | 43 16 (37.2)  | 1.6 [0.7–3.7]                                                                 | 0.316 | 1.0                  |
| 75–<100                           | 21 6 (28.6)   | 1.3 [0.4–4.1]                                                                 | 0.618 | 1.0                  |
| ≥100                              | 15 4 (26.7)   | 1.1 [0.3–4.9]                                                                 | 0.879 | 1.0                  |

52 establishments excluded because of missing data. Model 1: all target factors included. Model 2: factors with P<0.2 in model 1 included. 1P<0.1, *P<0.05, **P<0.01, ***P<0.001. 1Integrated more than 2 categories. CI, confidence interval; OR, odds ratio.

Table 5. Future Policy for the Smoking Environment According to CMs Taken by Eating Establishments in Kobe and Amagasaki

| CM of the establishments | The CM is adequate | The CM is not adequate, but it would be difficult to change | I plan to change the policy | The CM is adequate | The CM is not adequate, but it would be difficult to change | I plan to change the policy |
|--------------------------|---------------------|-----------------------------------------------------------|-----------------------------|---------------------|-----------------------------------------------------------|-----------------------------|
| Complete ban             | 71 (92.2)           | 6 (7.8)                                                   | 0 (0.0)                     | 31 (96.9)           | 1 (3.1)                                                   | 0 (0.0)                     |
| Install a designated smoking room | 5 (62.5)           | 3 (37.5)                                                 | 0 (0.0)                     | 4 (66.7)           | 2 (33.3)                                                   | 0 (0.0)                     |
| Smoking/nonsmoking areas with a wall | 4 (80.0)           | 1 (20.0)                                                 | 0 (10.0)                    | 2 (40.0)           | 2 (40.0)                                                   | 1 (20.0)                    |
| Smokers/nonsmokers by area | 1 (14.3)           | 4 (57.1)                                                 | 2 (28.6)                    | 5 (31.3)           | 10 (62.5)                                                  | 1 (6.3)                     |
| Smokers/nonsmokers by hours | 7 (46.7)           | 5 (33.3)                                                 | 3 (20.0)                    | 3 (42.9)           | 3 (42.9)                                                   | 1 (14.3)                    |
| No restriction            | 64 (41.3)           | 82 (52.9)                                                | 9 (5.8)                     | 91 (45.0)           | 106 (52.5)                                                 | 5 (2.5)                     |

CM, current measure.

A metabolite of nicotine was observed in staff members. No change was observed in staff members at venues where smoking was only partially restricted or permitted. López et al reported that, 2 years after the anti-smoking law was implemented in Spain, the vapor-phase nicotine concentration had decreased by 60% in public administration facilities, universities, and private-sector offices, as well as in venues where smoking was totally banned. However, nicotine levels had increased by 40% in hospitality venues that allowed smoking. In other words, a partial smoking ban does not protect employees working in such venues against SHS. Finally, the Spanish Parliament passed a comprehensive smoking law amending and strengthening the ban in 2011. The amended law extended smoking restrictions to all hospitality premises and SHS exposure in hospitality venues dramatically decreased after that.

We recently reported on a significant decrease in the number of ACS admissions in Kobe City, when compared with other districts in Hyogo. Nevertheless, as mentioned previously, cases of unstable angina increased in other areas,
and particularly in Amagasaki City, after the Hyogo Prefecture smoking ban was enacted. The results of this study indicate that compliance is higher in Kobe City than in Amagasaki City, confirming our earlier findings. However, the rate at which the complete smoking ban is being implemented is still low, at 31.7%, in Kobe City. Increasing awareness of the ban and efforts to promote compliance within eating establishments could lead to a larger decrease in ACS admissions. Moreover, among establishments in which the floor area reserved for customers was more than 100 m$^2$, only 5 establishments in Kobe City and 3 in Amagasaki City were compliant with the non-smoking ordinance. As only 2.8% of establishments have a floor area larger than 100 m$^2$, the great majority of establishments have a floor area less than 100 m$^2$. When implementing the smoking ban ordinance, a limit of 100 m$^2$ of floor area is not appropriate; it should be much lower.

Compliance with smoking bans has been reported in more than 90% of Western cities, states, and countries, including New York (USA), Saskatoon (Saskatchewan, Canada), and Scotland. Compared with these, Japan's data show particularly low compliance. In Japan, pubs and bars are considered places where smoking is socially acceptable. Moreover, tobacco companies consistently work to prevent and undermine smoke-free laws. The tobacco industry and its allies argue that smoke-free laws will economically damage hospitality venues. Despite widespread public support for smoke-free hospitality venues, opponents are trying to represent these laws as unpopular and damaging to small bars. These challenges and related smokers' rights activities have resulted in general non-compliance among pubs and bars. Our finding that Japanese-style taverns or bars (i.e., eating facilities that serve alcohol) were independent significant predictors of low compliance, supports this argument. However, this societal norm could be the result of an ineffective Ministry of Health, Labour and Welfare, and media campaign aimed at implementation and reactive measures. Indeed, our data show that the main reason for enforcing a complete smoking ban was “it’s the current trend (37.3%)”. When implementing a smoke-free ordinance, it is important to anticipate the opposition, use the media to target nonsmokers and reinforce public support, and actively enforce the ordinance.

One important concern is the economic impact of the legislation. As stated previously, 76.0% of the owners and managers of restaurants where smoking is permitted, who indicated that change would be difficult, explained that they were worried about losing customers, even though studies conducted using data from 30 communities in California and Colorado (USA) found that enforcing a ban on smoking had no negative effect on customer numbers. In our own survey, moreover, 44.7% of compliant restaurant owners and managers reported that their customer numbers had not changed after they enforced the complete smoking ban.

The main limitation of this study is a potential bias associated with self-reported data, which could affect the validity and reliability of the information gathered. Moreover, the survey response rate was only 23.3%, suggesting that a number of answers may have come from owners who were interested in the smoking ban. If so, the actual recognition and implementation rate may be lower than reported in this study.

In conclusion, approximately 4 years have passed since the smoking ordinance in Hyogo Prefecture was implemented. The recognition rate and compliance with the ordinance are still low, indicating that the ordinance is not sufficiently understood. There needs to be a strong and continuous socialization campaign to promote the smoking ban. It should target bar and restaurant owners and employees, and educate the public using mass media.

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References

1. WHO report on the global tobacco epidemic 2017. http://www.who.int/tobacco/global_report/2017/en/ (accessed October 20, 2017).
2. Katanoda K. Research on the comprehensive evaluation of the health and economic effects of tobacco smoking and tobacco control. 2015 Annual report. Health Labor Sciences Research Grant of the Ministry of Health, Labor and Welfare of Japan (Comprehensive Research on Life-Style Related Diseases including Cardiovascular Diseases and Diabetes Mellitus: H27-Junkankitou-Ippan-005). http://mhwe-grants.niph.go.jp/niph/search/NIDDD00.do?resrchNum=201508017A (accessed October 20, 2017).
3. Sargent RP, Shepard RM, Glantz SA. Reduced incidence of admissions for myocardial infarction associated with public smoking ban: Before and after study. BMJ 2004; 328: 977–980.
4. Meyers DG, He J. Cardiovascular effect of bans on smoking in public places: A systematic review and meta-analysis. J Am Coll Cardiol 2009; 54: 1249–1255.
5. Tan CE, Glantz SA. Association between smoke-free legislation and hospitalizations for cardiac, cerebrovascular, and respiratory diseases: A meta-analysis. Circulation 2012; 126: 2177–2183.
6. Jones MR, Barnoya J, Stranges S, Losonczy L, Navas-Acien A. Cardiovascular events following smoke-free legislations: An updated systematic review and meta-analysis. Curr Environ Health Rep 2014; 1: 239–249.
7. Sato Y, Minatoguchi S, Nishigaki K, Hirata KI, Masuyama T, Furukawa Y, et al. Results of a prospective study of acute coronary syndrome hospitalization after enactment of a smoking ban in public places in Hyogo prefecture: Comparison with Gifu, a prefecture without a public smoking ban. Circ J 2016; 80: 2528–2532.
8. Alpert HR, Carpenter CM, Travers MJ, Connolly GN. Environmental and economic evaluation of the Massachusetts Smoke-Free Workplace Law: A community health study. Environ Health Perspect 2007; 115: 269–281.
9. Eriksen M, Chaloupka F. The economic impact of clean indoor air laws. CA Cancer J Clin 2007; 57: 367–378.
10. Melberg HO, Lund KE. Do smoke-free laws affect revenues in pubs and restaurants? Eur J Health Econ 2012; 13: 93–99.
11. Fernández E, Fu M, Pascual JA, López MJ, Pérez-Ríos M, Schiuffino A. Impact of the Spanish smoking law on exposure to second-hand smoke and respiratory health in hospitality workers: A cohort study. PLoS One 2009; 4: e4244.
12. López MJ, Nebot M, Schiuffino A, Pérez-Ríos M, Fu M, Ariza C, et al. Two-year impact of the Spanish smoking law on exposure to second-hand smoke: Evidence of the failure of the ‘Spanish model’. Tob Control 2012; 21: 407–411.
13. López MJ, Fernández E, Pérez-Ríos M, Martínez-Sánchez JM, Schiuffino A, Galán I, et al. Impact of the 2011 Spanish smoking ban in hospitality venues: Indoor secondhand smoke exposure and influence of outdoor smoking. Nicotine Tob Res 2013; 15: 992–996.

Supplementary Files

Supplementary File 1

Appendix S1. Basic Information on Eating Establishments

Please find supplementary file(s):
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