Published in final edited form as:

J Immigr Minor Health. 2013 February ; 15(1): 132–140. doi:10.1007/s10903-012-9599-1.

Perceived discrimination and smoking among rural-to-urban migrant women working as restaurant/hotel workers and sex workers in China

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Abstract

Background—Smoking may be a coping mechanism for psychosocial stress caused by discrimination.

Methods—We conducted a cross-sectional survey of rural-to-urban migrant women working as restaurant/hotel workers (RHWs) and those working as sex workers (FSWs) in 10 Chinese cities to investigate whether perceived discrimination is associated with smoking. We interviewed RHWs at medical examination clinics and FSWs at entertainment venues. Modified Poisson regression was used to estimate prevalence ratios.

Results—Of the 1696 RHWs and 532 FSWs enrolled, 155 (9.1%) and 63 (11.8%) reported perceived discrimination, respectively. Perceived discrimination was independently associated with ever tried smoking (prevalence ratio [PR], 1.71; 95% confidence interval [CI], 1.31–2.23) and current smoking (PR, 2.52; 95% CI, 1.32–4.79) among RHWs and ever tried smoking (PR, 1.36; 95% CI, 1.16–1.61) and current smoking (PR, 1.63; 95% CI, 1.28–2.06) among FSWs.

Discussion—Perceived discrimination is associated with higher prevalence of smoking among rural-to-urban migrant women in China.

Keywords

health disparities; migrant health; smoking; tobacco control; women's health

Introduction

Marginalized populations are disproportionately affected by smoking globally, which may lead to disparities in smoking-attributable diseases such as cancers, cardiovascular disease, tuberculosis, and other lung diseases [1–5]. The mechanisms by which disparities in smoking behavior are produced are poorly understood. The psychosocial stress model posits

that members of disadvantaged social groups are more likely to engage in risky health behavior compared to those in more privileged groups because they experience higher levels of psychosocial stress [6]. Based on this model, smoking can be understood as a maladaptive coping mechanism for psychosocial stress [1]. Smoking produces a calming effect during stressful situations through the modulation of dopamine activity in the midbrain by nicotine [1].

In China, there are 211 million rural migrants living and working in cities, of whom, 50% are women [7]. Rural-to-urban migrants often experience stressful events that may increase their vulnerability to health risk behavior. For many rural-to-urban migrants, navigating life in the city, where the environment is drastically different from that found in rural villages, is a significant source of stress [8]. In addition, rural-to-urban migrants are more likely to have low income, live in crowded and substandard housing, and have unstable employment [9].

Perceived discrimination may be an important source of psychosocial stress which, in turn, may lead to adverse health risk behavior and outcomes [10–12]. Rural-to-urban migrants often encounter interpersonal and institutional discrimination in employment, housing, policing, education, and social services [13]. Most rural-to-urban migrants do not hold urban residence permits (*hukou*) and, therefore, are not eligible to receive many state-subsidized services in cities [9]. For example, in many cities, rural-to-urban migrants must pay an additional fee (*jiedu fei*) for their children to attend public schools [14]. Furthermore, rural-to-urban migrants receive little or no reimbursement through China's rural insurance plan for medical expenses incurred in cities [15]. Rural-to-urban migrants are also commonly stigmatized by urbanites as being loud, dirty, dishonest, violent, and lazy [9]. It is unknown whether perceived discrimination due to migrant status is associated with increased smoking among rural-to-urban women migrants in China.

Cigarette smoking is highly prevalent among Chinese men, but has remained low among women with a national prevalence of 2.4% in 2010 [16]. Despite this, there is cause for concern about the escalation of smoking among Chinese women. Rapidly changing social norms and employment patterns among women may be weakening the longstanding stigma against smoking among women in China [17]. In addition, internal documents of transnational tobacco corporations have shown that Chinese women are a priority group for market expansion [18, 19]. Advertisements, movie images, and sleek cigarette packaging have glamorized women smokers, linking smoking with gender freedom and modernity [19]. Studies among young Chinese women have shown that exposure to female brand cigarettes may increase the susceptibility to smoking initiation [20, 21]. Similar marketing strategies had been successful in creating the tobacco epidemic of smoking among women in high income countries [22]. Furthermore, since there are 539 million women aged 15 or older in China [23], a relatively small increase in prevalence of smoking can have substantial impact on population health. Despite the threat of widespread escalation of smoking among Chinese women, little is known about determinants of smoking in this population to guide the development of appropriate interventions for prevention in this vulnerable population.

We previously reported the results of our study among rural-to-urban migrant women, which found that smoking was associated with exposure to women's brand cigarettes and exposure to smoking among social contacts and at the workplace [24]. In the present study, we sought to determine whether perceived discrimination due to migrant status is associated with smoking behavior among rural-to-urban migrant women in China. Drawing from the psychosocial stress model of disparities in health behavior, we hypothesized that perceived discrimination will be independently associated with increased prevalence of ever and current cigarette smoking [6].

Methods

Study population

During July to November 2010, we conducted a cross-sectional survey of rural-to-urban migrant women in ten Chinese cities: Beijing, Chongqing, Guangzhou, Hefei, Hohhot, Kunming, Lanzhou, Nanchang, Shanghai, and Liaoning. We selected study sites that represented varying levels of smoking prevalence among women as indicated in recent national surveys, and in which the local Chinese Center for Disease Control (CCDC) partners had sufficient capacity to conduct survey research. In each study site, we recruited a convenience sample of rural-to-urban migrant women in two occupational groups: 1) hotel and restaurant workers (RHWs) and 2) female sex workers (FSWs) working in entertainment venues such as karaoke bars and night clubs. RHWs and FSWs were selected because of the established access to women in these occupations for study recruitment.

We recruited RHWs from local CCDC medical facilities that provide mandatory annual medical examinations to these women. CCDC officers screened consecutive examination center attendees for study eligibility and offered enrollment to eligible participants. Enrollment criteria for RHWs included: women aged 18–24 who worked in hotels or restaurants or who were unemployed at the time of the survey but reported working as a restaurant or hotel worker in their previous job. This latter criterion accounted for the unstable employment conditions experienced by many rural-to-urban migrant workers in China [25]. We enrolled women aged 18–24 because they are more likely to accurately recall circumstances pertaining to smoking initiation, which commonly occurs in adolescence.

For FSWs, enrollment was restricted to women aged 18–30 years who were working in entertainment venues which had existing relationships with CCDC officers for HIV research and prevention activities. Based on observations during our pilot study, we used an older upper age limit for FSWs to ensure the enrollment of a sufficient sample size for meaningful statistical analysis and to enroll a more representative sample of the general FSW population. CCDC study interviewers obtained permission from entertainment venue managers to conduct the study at the entertainment venues and scheduled study visits for data collection.

Respondents who answered “Yes” to “Do you have a rural *hukou* (residence) registration?” were eligible for the survey. The Institutional Review Boards of San Diego State University and Peking Union Medical Center reviewed and approved the study protocol and instruments. All participants provided informed consent prior to participating in the study.

Measures

In-person interviews were conducted in Chinese by local CCDC staff members who received three days of training prior to study implementation. The questionnaire included items on demographic characteristics, migration history, smoking, perceived discrimination, and satisfaction with life and job. We determined “ever tried smoking” based on the question, “Have you ever smoked cigarettes, even if just one or two cigarette puffs?” [26] We determined “current smoking” based on the participant answering “daily” or “less than daily” to the question, “In the past 30 days, have you smoked tobacco on a daily basis?” (Adapted from the Global Adult Tobacco Survey [16]) We used a measure of perceived discrimination from a previous study of Mexican migrants in the United States that asked the following question, “How often do people treat you unfairly because you are a migrant? Never, seldom, sometimes, often, or always?” [27] We dichotomized this variable into “sometimes/often/always” and “never/rarely” for analysis. We also asked questions regarding satisfaction with life and job as proxy measures for psychosocial stress which

included: “How satisfied are you with your life? Very dissatisfied, dissatisfied, just okay, satisfied, or very satisfied?” and, for participants who are currently employed, “How satisfied are you with your job? Very dissatisfied, dissatisfied, just okay, satisfied, or very satisfied?” The study questionnaire was pilot tested at two study sites (Beijing and Hohhot) prior to data collection to verify that the questions were clear and accurately captured the responses.

Statistical analysis

We conducted separate analyses for RHWs and FSWs because of the different sampling methods employed for the two groups. We conducted univariate analysis of factors associated with perceived discrimination and smoking using Pearson's χ^2 test for categorical variables and the Student's t-test for continuous variables. For multivariable analysis, we constructed Poisson regression models with robust variance to estimate adjusted prevalence ratios of smoking (ever tried smoking and current smoking) between participants who reported perceived discrimination and those who did not report perceived discrimination [28–29]. We used this approach because the estimated effect size based on odds ratios derived from logistic regression models can be misleadingly high when the prevalence of the outcome is high, as is the case for ever tried smoking in this study [28]. Separate models were constructed for the following subgroup/outcome combinations: RHW/ever tried smoking, RHW/current smoker, FSW/ever tried smoking, and FSW/current smoker. The final models included the following covariates which represent established predictors of smoking based on previous literature: age, educational attainment, monthly income, and city (categorized based on the prevalence of ever tried smoking as low [$<20\%$], moderate [$20\%–29\%$], or high [$\geq 30\%$]). We also included the following covariates which we considered to be conceptually important confounders of the association between perceived discrimination and smoking: ethnicity (minority group vs. Han majority), months since first moved to the city, and satisfaction with life and job. All variables were included in the final model regardless of their association with smoking in our study population. To assess multicollinearity, we calculated tolerance statistics for each variable in the final models [30]. Tolerance value less than 0.10 was considered evidence of multicollinearity [30]. We used SAS 9.2 (Cary, North Carolina) for all analyses and determined statistical significance at the 0.05 level for 2-sided statistical tests.

Results

We enrolled 1697 RHW and 532 FSW participants with response rates of 98.3% and 99.8%, respectively. The mean age was 20.6 for RHWs and 23.1 for FSWs (Table 1). The majority of the participants belonged to the Han ethnicity; completed high school, technical school, college, or university; were single; and lived in a city with moderate to high smoking prevalence. On average, monthly income was 1419 Chinese Yuan (CNY; US \$218) and 4270 CNY (US \$657) and months since first migration to the city was 31.6 and 57.0 for RHWs and FSWs, respectively, and age at first migration was 18. About 7% of the RHWs and 10% of the FSWs reported dissatisfaction with life and with their job.

Perceived discrimination and smoking among RHWs

Perceived discrimination, ever tried smoking, and current smoking were reported by 9.1%, 18.4% and 3.2% among RHWs, respectively (Table 1). In univariate analysis, older age, higher monthly income, longer time since first migration, dissatisfaction with life and job, and perceived discrimination were associated with higher prevalence of ever tried smoking among RHWs (Table 2). Dissatisfaction with life and perceived discrimination were associated with current smoking among RHWs (Table 2).

The prevalence of smoking was higher among RHWs who reported perceived discrimination compared to those who did not report perceived discrimination for ever tried smoking (33.5% vs. 16.9%; PR, 1.99; 95% CI, 1.55–2.55) and current smoking (8.4% vs. 2.7%; PR, 3.15; 95% CI, 1.73–5.76; Tables 2 and 3). Perceived discrimination was independently associated with ever tried smoking and current smoking among RHWs in the modified Poisson regression models controlling for potential confounders (Table 3). In addition, higher income and longer time since first migration to the city were independently associated with ever tried smoking, and reporting neutral or dissatisfied with life was independently associated with higher prevalence of current smoking among RHWs. We found no evidence of multicollinearity in either model for RHWs.

Perceived discrimination and smoking among FSWs

Perceived discrimination, ever tried smoking, and current smoking were reported by 11.8%, 58.3% and 41.9%, respectively, among FSWs (Table 1). In univariate analysis, higher monthly income, longer time since migration, feeling neutral or dissatisfied with life and job, and perceived discrimination were associated with higher prevalence of ever tried smoking among FSWs (Table 2). Older age, higher monthly income, longer time since migration, feeling neutral or dissatisfied with life, and perceived discrimination were associated with higher prevalence of current smoking among FSWs (Table 2).

Smoking prevalence was higher among FSWs who reported perceived discrimination compared to those who did not report perceived discrimination for ever tried smoking (77.8% vs. 55.7%; PR, 1.40; 95% CI, 1.20–1.63) and current smoking (61.9% vs. 39.2%; PR, 1.58, 1.26–1.97; Tables 2 and 3). Perceived discrimination was independently associated with ever tried smoking and current smoking in the modified Poisson regression models controlling for potential confounders among FSWs (Table 3). In addition, higher income was independently associated with ever tried smoking, and higher income and reporting neutral to the life satisfaction question were independently associated with current smoking among FSWs. Completion of college or university education was independently associated with a lower prevalence of current smoking among FSWs. We found no evidence of multicollinearity in either model for FSWs.

Discussion

There is increasing evidence that psychosocial stress caused by perceived discrimination can lead to increased smoking behavior among some vulnerable populations [25, 31–35]. For example, a study conducted among pregnant women in urban United States found an association between perceived racial discrimination and increased smoking among black women but not among Hispanic women [35]. Another study conducted among black adolescent girls in the United States found that psychosocial stress mediated the relationship between perceived discrimination and smoking, which supports the psychosocial stress model of disparities in health behavior [34]. Studies among rural-to-urban migrants in China have demonstrated an association between perceived discrimination and lower self-rated physical health, psychological health, and quality of life [11–13]. To our knowledge, the present study is the first to demonstrate an association between perceived discrimination and smoking behavior among rural-to-urban migrant women in China. The association remained after controlling for potential confounders and was consistent in separate analyses of RHWs and FSWs and for both ever tried smoking and current smoking.

We also found evidence of association between smoking and dissatisfaction with life, lower educational attainment, higher income, city of residence, and longer time since first migration. These findings are consistent with a previous study of smoking among rural-to-urban migrants in Beijing [36]. In that study, job satisfaction was also found to be associated

with current smoking. However, the study did not adjust for correlates to determine whether independent associations exist between these factors and smoking. In our study, we found an association between job satisfaction and smoking in univariate analysis, but the association did not persist after controlling for other factors in multivariate analysis.

The prevalence of current smoking among FSWs was nearly 20 times the reported national prevalence. FSWs may be a particularly disadvantaged subgroup among rural-to-urban migrant women. Previous studies have shown a high prevalence of alcohol use, illicit drug use, and risky sexual behavior among FSWs [37]. While we did not collect specific information on discrimination related to being a FSW, FSWs are commonly subject to discrimination in China [38]. Commercial sex is illegal in China and FSWs are often targets of police harassment, fines, and incarceration [38]. Most FSWs keep their occupation a secret from family and friends [39]. A recent study among FSWs in China reported a high prevalence of perceived discrimination and its association with adverse mental health outcomes, including depressive symptoms, suicide ideation, and attempted suicide [39]. Perceived discrimination and other psychosocial stressors associated with being a FSW might, at least in part, explain the high prevalence of smoking in this population.

We previously recommended the implementation of smoke-free policies and increased taxation to prevent smoking initiation among rural-to-urban migrant women [24]. Restrictions on marketing of high-end women's brand cigarettes might also help prevent smoking among women, particularly among those with higher income. Tobacco control interventions should be prioritized for cities with higher prevalence of smoking in this population (such as Hefei, Beijing, Chongqing, and Liaoning), and among FSWs.

Our current findings regarding the association between perceived discrimination and smoking indicate that interventions that are outside of the traditional realm of tobacco control may also help prevent smoking in this population. In particular, policies that reduce exposure to psychosocial stressors and provide support for coping with stress may help prevent smoking among rural-to-urban migrants. For example, ensuring that rural-to-urban migrants have same social and political rights in cities that are currently available to urbanites might help reduce psychosocial stress in this population. Anti-discrimination laws should also be implemented to protect rural-to-urban migrants from discriminatory practices. In addition, rural-to-urban migrants should be provided with services and resources to better cope with stressors. For example, numerous non-governmental organizations have been formed in China that provide social services to migrant communities, such as distribution of clothing and establishing schools for migrant children [40]. Additional support and expansion of such efforts could also improve life satisfaction which may further reduce susceptibility to smoking.

Study limitations include the cross-sectional design, which limits our ability to draw conclusions regarding causality. However, it is more likely that perceived discrimination increases smoking behavior instead of smoking causing discrimination. It is possible that we did not adequately control for residual confounders that account for the observed association between psychosocial stress and smoking. In addition, we may not have included adequate measures of perceived discrimination. Because this cross-sectional survey was not designed primarily to examine discrimination, only one item was included to measure this construct. In fact, self-reported measures of discrimination may underestimate the prevalence of discrimination, particularly among those in more disadvantaged populations [31]. Because we employed convenience sampling, our results may not be generalizable to the overall population of rural-to-urban migrant women who are RHWs or FSWs. In particular, FSWs were only sampled at entertainment venues with established relationships with the CCDC, which may have led to sampling bias.

Conclusion

We present empirical evidence that show an association between perceived discrimination and smoking behavior among a highly vulnerable population of rural-to-urban migrant women in China. Future studies should describe in greater detail the types and frequencies of incidents of discrimination experienced by rural-to-urban migrants. In addition, we recommend implementation of prospective studies to determine more precisely the health and behavioral effects of perceived discrimination in this population. A greater understanding of the susceptibility to smoking in these vulnerable populations is critical for the development of accessible and equitable interventions for tobacco control in China.

Acknowledgments

We are grateful for the China Centers for Disease Control staff who conducted data collection. This study was supported by the U.S. National Institute of Health grant 1 R03 TW008361-01. The funding agency had no role in study design and the collection, analysis, and interpretation of data and the writing of the article and the decision to submit it for publication.

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Table 1

Demographic characteristics among rural-to-migrant women in ten Chinese cities, July-November 2010.

Characteristic	Restaurant/Hotel Worker (n=1697) n (%)	Sex Worker (N = 532) n (%)
Age, mean $\pm$ SD	20.6 $\pm$ 1.8	23.1 $\pm$ 3.3
Ethnicity		
Han	1552 (91.5)	487 (91.5)
Minority	145 (8.5)	45 (8.5)
Monthly income (CNY), mean $\pm$ SD	1419 $\pm$ 869	4270 $\pm$ 3393
Education		
Secondary school or less	641 (37.8)	251 (47.2)
High school/technical school	728 (43.0)	213 (40.0)
College/university	325 (19.2)	68 (12.8)
Marital status		
Single	1421 (83.7)	360 (67.7)
Married	195 (11.5)	113 (21.2)
Other	81 (4.8)	59 (11.1)
City (by smoking level)		
Low smoking prevalence	330 (19.4)	103 (19.4)
Moderate smoking prevalence	715 (42.1)	210 (39.5)
High smoking prevalence	652 (38.4)	219 (41.2)
Age at first migration, mean $\pm$ SD	17.9 $\pm$ 2.1	18.3 $\pm$ 3.1
Months since first migration, mean $\pm$ SD	31.6 $\pm$ 27.2	57.0 $\pm$ 41.9
Life satisfaction		
Dissatisfied	119 (7.0)	58 (10.9)
Neutral	818 (48.2)	300 (56.4)
Satisfied	759 (44.8)	174 (32.7)
Job satisfaction		
Dissatisfied	116 (6.8)	49 (9.2)
Neutral	759 (44.7)	295 (55.5)
Satisfied	685 (40.4)	188 (35.3)
Currently unemployed	137 (8.1)	
Perceived discrimination		
Never/Rarely	1542 (90.9)	469 (88.2)
Sometimes/Often/Always	155 (9.1)	63 (11.8)
Smoking behavior		
Ever tried smoking	312 (18.4)	310 (58.3)
Current smoker	54 (3.2)	223 (41.9)

Note: Percent calculations represent column percents. Cities are Guangzhou, Hohhot (low smoking prevalence); Lanzhou, Shanghai, Kunming, Nanchang (moderate smoking prevalence); Hefei, Beijing, Chongqing, Liaoning (high smoking prevalence). CNY, Chinese Yuan.

Table 2
Correlates of smoking behavior, rural-to-migrant women in ten Chinese cities, July–November 2010.

Characteristic	Restaurant/Hotel Worker				Sex Worker			
	Ever Tried Smoking n/N (%)	p-value	Current Smoker n/N (%)	p-value	Ever Tried Smoking n/N (%)	p-value	Current Smoker n/N (%)	p-value
Age		0.038		0.555		0.489		0.048
18–19	89/539 (16.5)		20/539 (3.7)		45/75 (60.0)		23/75 (30.7)	
20–21	104/614 (16.9)		16/614 (2.6)		67/127 (52.8)		47/127 (37.0)	
22–24	119/544 (21.9)		18/544 (3.3)		88/151 (58.3)		69/151 (45.7)	
25–30	-		-		110/179 (61.5)		84/179 (46.9)	
Ethnicity		0.551		0.849		0.380		0.500
Han	288/1552 (18.6)		49/1552 (3.2)		281/487 (57.7)		202/487 (41.5)	
Minority	24/145 (16.6)		5/145 (3.4)		29/45 (64.4)		21/45 (46.7)	
Monthly income (CNY)		<0.001		0.455		0.012		<0.001
0–1199	126/816 (15.4)		31/816 (3.8)		21/43 (48.8)		14/43 (32.6)	
1200–1799	93/516 (18.0)		11/516 (2.1)		28/63 (44.4)		16/63 (25.4)	
1800–2999	55/234 (23.5)		9/234 (3.8)		56/107 (52.3)		36/107 (33.6)	
3000	19/59 (32.2)		1/59 (1.7)		196/306 (64.1)		150/306 (49.0)	
Refused	19/72 (26.4)		2/72 (2.8)		9/13 (69.2)		7/13 (53.8)	
Education		0.637		0.428		0.118		0.160
Secondary school or less	125/641 (19.5)		25/641 (3.9)		153/251 (61.0)		116/251 (46.2)	
High school/tech school	129/728 (17.7)		20/728 (2.7)		125/213 (58.7)		82/213 (38.5)	
College/university	57/325 (17.5)		9/325 (2.8)		32/68 (47.1)		25/68 (36.8)	
City (by smoking level)		<0.001		<0.001		<0.001		<0.001
Low prevalence	34/330 (10.3)		4/330 (1.2)		39/103 (37.9)		21/103 (20.4)	
Moderate prevalence	117/715 (16.4)		16/715 (2.2)		120/210 (57.1)		78/210 (37.1)	
High prevalence	161/652 (24.7)		34/652 (5.2)		151/219 (68.9)		124/219 (56.6)	
Months since first migration		<0.001		0.259		0.027		0.012
<12 months	67/505 (13.3)		11/505 (2.2)		31/52 (59.6)		15/52 (28.8)	
13–24 months	50/313 (16.0)		15/313 (4.8)		40/93 (43.0)		28/93 (30.1)	
25–48 months	100/487 (20.5)		13/487 (2.7)		79/127 (62.2)		57/127 (44.9)	
49–72 months	50/251 (19.9)		10/251 (4.0)		59/97 (60.8)		48/97 (49.5)	

Characteristic	Restaurant/Hotel Worker				Sex Worker			
	Ever Tried Smoking		Current Smoker		Ever Tried Smoking		Current Smoker	
	n/N (%)	p-value	n/N (%)	p-value	n/N (%)	p-value	n/N (%)	p-value
73 months	45/141 (31.9)		5/141 (3.5)		101/163 (62.0)		75/163 (46.0)	
Life satisfaction		<0.001		0.005		0.009		0.010
Dissatisfied	35/119 (29.4)		8/119 (6.7)		37/58 (63.8)		29/58 (50.0)	
Neutral	163/818 (19.9)		32/818 (3.9)		188/300 (62.7)		137/300 (45.7)	
Satisfied	114/759 (15.0)		14/759 (1.8)		85/174 (48.9)		57/174 (32.8)	
Job satisfaction		0.005		0.118		0.008		0.116
Dissatisfied	35/116 (30.2)		6/116 (5.2)		29/49 (59.2)		24/49 (49.0)	
Neutral	140/759 (18.4)		30/759 (4.0)		188/295 (63.7)		131/295 (44.4)	
Satisfied	112/685 (16.4)		16/685 (2.3)		93/188 (49.5)		68/188 (36.2)	
Currently unemployed	25/137 (18.2)		2/137 (1.5)		-		-	
Perceived discrimination		<0.001		<0.001		<0.001		<0.001
Never/Rarely	260/1542 (16.9)		41/1542 (2.7)		261/469 (55.7)		184/469 (39.2)	
Sometimes/Often/Always	52/155 (33.5)		13/155 (8.4)		49/63 (77.8)		39/63 (61.9)	

Note: n/N represent number of participants reporting smoking behavior divided by the total number of participants with the participant characteristic. P-values based on the Pearson's χ^2 test. Cities are Guangzhou, Hohhot (low smoking prevalence); Lanzhou, Shanghai, Kunming, Nanchang (moderate smoking prevalence); Hefei, Beijing, Chongqing, Liaoning (high smoking prevalence). CNY, Chinese Yuan.

Table 3

Unadjusted and adjusted prevalence ratios for smoking based on multivariable Poisson regression models, rural-to-migrant women in ten Chinese cities, July–November 2010.

Variable	Restaurant/Hotel Worker						Sex Worker					
	Ever Tried Smoking			Current Smoker			Ever Tried Smoking			Current Smoker		
	Unadjusted PR (95% CI)	Adjusted PR (95% CI)		Unadjusted PR (95% CI)	Adjusted PR (95% CI)		Unadjusted PR (95% CI)	Adjusted PR (95% CI)		Unadjusted PR (95% CI)	Adjusted PR (95% CI)	
Perceived discrimination												
Never/Rarely	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Sometimes/Often/Always	1.99 (1.55, 2.55)	1.71 (1.31, 2.23)		3.15 (1.73, 5.76)	2.52 (1.32, 4.79)		1.40 (1.20, 1.63)	1.36 (1.16, 1.61)		1.58 (1.26, 1.97)	1.63 (1.28, 2.06)	
Age		0.97 (0.91, 1.04)			0.92 (0.75, 1.13)			0.99 (0.96, 1.02)			1.00 (0.96, 1.03)	
City Smoking Level												
Low Prevalence			1.00			1.00			1.00			1.00
Medium Prevalence		1.44 (1.00, 2.08)			1.47 (0.49, 4.37)					1.58 (1.17, 2.14)	2.16 (1.42, 3.28)	
High Prevalence		2.20 (1.54, 3.15)			3.93 (1.37, 11.24)			2.00 (1.51, 2.65)			3.32 (2.26, 4.89)	
Educational Attainment												
Up to secondary school			1.00			1.00			1.00			1.00
High School/Tech School		0.82 (0.65, 1.04)			0.61 (0.34, 1.10)			0.96 (0.82, 1.12)			0.80 (0.64, 1.00)	
College/University		1.03 (0.76, 1.40)			0.76 (0.30, 1.91)			0.75 (0.57, 1.00)			0.73 (0.51, 1.04)	
Monthly Income (x1000 CNY)		1.14 (1.07, 1.22)			0.85 (0.57, 1.28)			1.03 (1.00, 1.06)			1.08 (1.05, 1.11)	
Ethnicity												
Han			1.00			1.00			1.00			1.00
Minority		1.01 (0.70, 1.44)			0.76 (0.31, 1.85)			0.84 (0.65, 1.09)			0.83 (0.59, 1.15)	
Mo. since 1st migration (x12)		1.11 (1.06, 1.16)			1.05 (0.90, 1.23)			1.01 (0.99, 1.04)			1.03 (0.99, 1.07)	
Life Satisfaction												
Satisfied			1.00			1.00			1.00			1.00
Neutral		1.30 (1.00, 1.69)			2.24 (1.07, 4.69)			1.16 (0.96, 1.41)			1.38 (1.06, 1.81)	
Dissatisfied		1.47 (0.98, 2.22)			3.55 (1.27, 9.94)			1.21 (0.91, 1.63)			1.37 (0.91, 2.07)	
Job Satisfaction												
Satisfied			1.00			1.00			1.00			1.00
Neutral		0.93 (0.71, 1.23)			1.12 (0.56, 2.24)			1.18 (0.98, 1.42)			1.06 (0.83, 1.36)	
Dissatisfied		1.36 (0.91, 2.02)			1.02 (0.36, 2.88)			0.93 (0.68, 1.27)			0.90 (0.60, 1.35)	

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Variable	Restaurant/Hotel Worker				Sex Worker			
	Ever Tried Smoking		Current Smoker		Ever Tried Smoking		Current Smoker	
	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Unemployed		1.22 (0.79, 1.88)		0.44 (0.09, 2.18)				

Note: Prevalence ratio estimates with 95% confidence intervals that do not overlap 1.00 were considered statistically significant and printed in bold. Adjusted prevalence ratios were estimated by controlling for all variables listed on the column. Monthly income not included in models for restaurant and hotel workers due to missing data (n=290). There were no unemployed participants among sex workers. Cities are Guangzhou, Hohhot (low smoking prevalence); Lanzhou, Shanghai, Kunming, Nanchang (moderate smoking prevalence); Hefei, Beijing, Chongqing, Liaoning (high smoking prevalence). CNY, Chinese Yuan. PR, prevalence ratio; CI, confidence interval.