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Workplace social capital and smoking among Chinese male employees: A multi-level, cross-sectional study

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ABSTRACT

Objectives. The present study sought to investigate the associations between workplace social capital and smoking status among Chinese male employees.

Methods. A cross sectional study with a two-stage stratified sampling procedure was conducted in Shanghai in 2012. In total, 1603 male workers from 35 workplaces were involved. Workplace social capital was assessed using a validated and psychometrically tested eight-item measure. Multilevel logistic regression analysis was conducted to explore whether individual-level social capital and aggregated workplace-level social capital were associated with smoking.

Results. Overall, 54.2% of the subjects smoked currently. After controlling for individual covariates (age, education level, marital status, occupational status and job stress), compared to workers in the highest quartile of individual-level social capital, the prevalence ratios of smoking for workers in the third quartile, second quartile and lowest quartile were 1.26 (95% CI: 1.11–1.38), 1.35 (95% CI: 1.19–1.50) and 1.39 (95% CI: 1.24–1.51) respectively. However, there was no relationship between workplace-level social capital and smoking status.

Conclusions. Higher individual-level social capital was associated with a lower likelihood of smoking among Chinese male employees. By contrast, no clear association was found between workplace-level social capital and smoking. Further longitudinal studies are warranted to examine the possible link between workplace social capital and smoking cessation in Chinese workplaces.

As the most preventable cause of premature death and disability, cigarette smoking is one of the most important public health challenges worldwide (WHO, 2003). China is the world's largest producer and consumer of tobacco. The working population aged 30 to 50 years has the highest smoking prevalence (Yang et al., 2005). Furthermore, smoking in China has been commonly found to be more prevalent among men than women (Li et al., 2011). Therefore it is important to those interested in tobacco control to explore the factors related to cigarette smoking among Chinese male employees.

In China, smoking is a rather complex behavior influenced by genetic, behavioral, psychological and social factors (Broms et al., 2006; Ding et al., 2009; Leinsalu et al., 2007). For example, the social practices of cigarette gifting and sharing of cigarette strongly contribute to smoking initiation as well as failure to quit smoking among Chinese males (Hu et al., 2012; Rich and Xiao, 2012). Cigarette sharing is generally reserved for adult men and is often associated with workplace and other professional interactions. The health of men is at greater risk from the practice of cigarette sharing because women and children are exempted from situations requiring cigarette sharing (Hu et al., 2012). Furthermore, current smoking in China has also been associated with involuntary unemployment, absence of home smoking restrictions, and social reinforcement such as friends' smoking (Ding et al., 2009).

Social capital is defined as a feature of social structures, such as levels of interpersonal trust and norms of reciprocity and mutual aid, which constitute resources for individuals and facilitate collective action (Coleman, 1998; Helliwell and Putnam, 2004; Kawachi et al., 2004). It is therefore largely seen as a characteristic of social groups rather than individuals and it is born of shared experience, which fosters mutual trust and reciprocity (Shortt, 2004). However, social capital is created in the connections among individuals in social groups, and it can therefore also be seen as an asset of individuals (Coleman, 1988; Portes, 1998). Subsequently, the health effects of social capital may be observed both at the individual and collective levels (Murayama et al., 2012), should be considered as both an individual and group attributes (Kawachi et al., 2008), and measured at both levels (Szreter and Woolcock, 2004). Social capital at the group (contextual) level has most often been measured by aggregating individual perceptions of social capital (Murayama et al., 2012).

Social capital, as one of the possible psychosocial determinants of smoking (Lindstrom, 2008), has received much attention in public health research. Previous studies have demonstrated that higher levels of social capital are positively related to less smoking (Kawachi et al., 2008; Li and Delva, 2012).

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Compared to large geographic neighborhoods, workplaces may capture important social interactions and networks more specifically and with more detail. In this way workplaces are an important unit of measurement of social capital (Kawachi, 1999; Kouvonen et al., 2006). Previous research on workplace social capital has hypothesized that within work units social capital heavily depends on the informal day-to-day and face-to-face interactions between work colleagues, superiors, and subordinates, which can be assumed to be developed at the workplace by participating and acting for mutual company benefit (Kouvonen et al., 2006). Previous studies have indicated that workplace social capital is related to self-rated health (Oksanen et al., 2008; Suzuki et al., 2010b), mental health (Kouvonen et al., 2008a; Oksanen et al., 2010), mortality (Oksanen et al., 2011), and health-related behaviors (Sapp et al., 2010; Suzuki et al., 2010a).

Although there have been initial studies into the relationship between workplace social capital and smoking, most of these have been conducted in western developed countries. Furthermore, from the group of studies that have been conducted there has yet to be consistent results investigating the workplace social capital and smoking status. Individual-level social capital has been found to be inversely associated with daily smoking (Lindstrom, 2004), and positively associated with smoking cessation (Kouvonen et al., 2008b), but aggregated-level social capital was found not related to smoking behavior in Finland. On the other hand, company-level mistrust has been associated with a higher likelihood of smoking among Japanese employees, while individual perceptions of mistrust were not associated with smoking (Suzuki et al., 2010a). Since the meaning of workplace social capital may be influenced by cultural backgrounds (Kouvonen et al., 2006; Suzuki et al., 2010b), further studies are warranted to examine these relationships based on employees in different workplaces (e.g., private vs. public sector), by personal demographics, and in different cultural settings. For instance, a previous study conducted in Taiwan demonstrated that although gender differences existed in some aspects (social contact and social participation) of social capital, the relationship of smoking and social capital was not different between males and females (Chuang and Chuang, 2008). However, the practices of gifting and sharing cigarettes were found to be common among Chinese males in the workplace (Rich and Xiao, 2012). Accordingly, in the present study we sought to examine the association between individual-level social capital and aggregated-level social capital with smoking status among Chinese male employees.

Methods

Population

The current study was conducted in Shanghai, China during March to November 2012. Employees (n = 2979) from 35 workplaces were randomly selected using a two-stage sampling procedure. In the first stage of sampling, a convenience-sampling method was used. First, eleven districts were selected among the total 17 districts in Shanghai. Then, the Shanghai Health Promotion Committee contacted workplaces to notify them of their eligibility to participate in the study. In each district, the first governmental agency and the first manufacturing worksite that agreed to participate in the study were selected. Because there was no service company with more than 100 employees in the two districts (Qingpu and Jinshan), the first two service companies were selected in these districts. The first responding service company was selected in the other 9 districts. Overall, 11 governmental agencies, 11 manufacturing worksites and 13 service companies participated in the current study. In the second stage of sampling, 100 employees were randomly selected from each workplace that had more than 100 employees; otherwise, all employees were selected. Workplace-level social capital was based on the aggregated assessments of co-workers within each company. Managers in all departments were excluded to limit our investigation to general employees. A self-administered questionnaire was distributed via the Human Resources department of each workplace to all selected employees. Completion of the questionnaires was anonymous. The Institutional Review Board of the School of Public Health, Fudan University, approved the study.

Measurement

Smoking status

Smoking status was assessed by the following two questions: (1) have you ever smoked more than 100 cigarettes in your entire life? (2) did you smoke, even a puff in the past 30 days? Current smokers were those who responded "yes" to both questions; otherwise, they were coded to be nonsmokers.

Workplace social capital

Workplace social capital was assessed with a validated and psychometrically tested eight-item measure (Gao et al., 2012). Based on the original scale (Kouvonen et al., 2006), an initial translation into Chinese was conducted, and then back translated into English to verify that the content of the original scale was maintained. Using a 5-point Likert-scale, the participants rated their workplace social capital, defined as the shared values, attitudes, and norms of trust and reciprocity as well as practices of collective action in their workplace (Kouvonen et al., 2006). The items were as follows: (i) 'We have a "we are together" attitude'; (ii) 'People feel understood and accepted by each other'; (iii) 'We can trust our supervisor'; (iv) 'Our supervisor treats us with kindness and consideration'; (v) 'Our supervisor shows concern for our rights as an employee'; (vi) 'People keep each other informed about work-related issues in the workplace'; (vii) 'Do members of the workplace build on each other's ideas in order to achieve the best possible outcome?'; and (viii) 'People in the workplace cooperate in order to help develop and apply new ideas'. Prior psychometric evaluation in Chinese employees has demonstrated the scale to have high internal consistency (Cronbach's alpha of 0.94) (Gao et al., 2012). The Cronbach's alpha was 0.96 for the current sample.

We coded social capital in two alternative ways: (a) individual-level social capital, using each individual's own assessment, to minimize subjectivity bias, (b) aggregated-level social capital, summing up the assessment of co-workers, but excluding the individual's own assessment. Both individual and aggregated-level social capital scores were divided into quartiles for the analysis, the highest quartile indicates the highest level of workplace social capital.

Covariates

The following variables were hypothesized as possible confounders for statistical control: age (10-year categories), marital status (married or cohabiting vs. other), occupational status (public servant vs. other), and education (less than senior high school vs. more advanced educational attainment). Job stress was assessed by one question (Metzenthin et al., 2009): "generally speaking, how do you assess your job stress?". Response options for job stress ranged from 0 (low job stress) to 10 (high job stress). The score was divided into quartiles for the analysis with the highest quartile indicating the highest level of job stress.

Statistic analyses

Our data had a multilevel structure comprised of employees (at level 1) nested within workplaces (at level 2). Data were fitted using multilevel logistic regression models, adjusting for both individual- and aggregated-level variables as fixed effects and allowing for heterogeneity between workplaces. The analysis was conducted in steps based upon previous recommendations (Wang et al., 2008). After examining the company-level variance in smoking without including any explanatory variables (empty model), we examined the relationship between individual-level social capital and aggregated-level social capital with current smoking (model 1 and model 2, respectively). Next, we included individual-level covariates to model 1 and model 2 (model 3 and model 4). Finally, we modeled all individual variables and aggregated-level social capital simultaneously (model 5). We used −2 log likelihood (−2LL) and Akaike information criterion (AIC) to compare the goodness-of-fit of each model (Wang et al., 2008). Additionally, recognizing that the incidence of our outcome of interest was common (>10%), the adjusted odds ratio derived from the logistic regression was likely to no longer approximate the risk ratio (Zhang and Yu, 1998). Therefore, prevalence ratios (PRs) were derived by adjusting ORs according to the proportion of the outcome in the referent groups (P_0) as follows: $PR = OR / ((1 - P_0) + (P_0 * OR))$ (Carson and Janssen, 2012; Zhang and Yu, 1998). The SAS version 9.1.3 program package was used for all analyses (SAS Institute, Inc., Cary, NC, USA). The multi-level analyses were performed using the GLIMMIX procedure.