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The impact of regional economic reliance on the tobacco industry on current smoking in China



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ABSTRACT

The purpose of this study was to conduct a preliminary assessment of province of residence and other contextual factors on the likelihood of being a current smoker in China. A cross-sectional, multistage sampling process was used to recruit participants, and their smoking status and sociodemographic characteristics were obtained through face-to-face interviews. The contextual variables were retrieved from a national database. Multilevel logistic regression analysis was performed to assess the impact of provincial economic reliance on the tobacco industry, as well as individual-level characteristics, on the likelihood of being a current smoker. Participants totaled 20,601 from 27 cities located in 26 of the 31 municipalities/provinces in China. Overall smoking prevalence was 31.3% (95% CI: 19.3–33.2%), with rates being highest in Yinchuan City in Ningxia Province (49.8%) and lowest in Shanghai (21.6%). The multilevel analysis showed an excess likelihood of being a current smoker for individuals living in provinces with the highest rate of cigarette production relative to those with the smallest ($p < 0.001$). Findings underscore the importance of restricting cigarette production and regulating the marketing of tobacco products in China.

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1. Introduction

Globally, the tobacco-smoking epidemic is responsible for approximately 5.4 million deaths per year, including more than 600,000 deaths of nonsmokers (World Health Organization, 2011). The annual death toll is projected to exceed 8 million by 2030. More than 80% of these deaths will occur in less developed nations, and the epidemic will strike hardest in those countries with rapidly growing economies (World Health Organization, 2008). China leads the world in tobacco consumption, and approximately one million Chinese die each year from tobacco-related causes. This death toll is projected to reach two million annually by 2025 and three million by 2050 (The People's Republic of China Ministry of Health, 2007). However, despite tobacco imposing tremendous economic and health costs in China, with few exceptions (Pan and Hu, 2008), little attention has been paid to

environmental factors which help perpetuate such high rates of smoking and how these may be important in informing tobacco control policies.

Ecological models can allow for smoking being influenced by both individual and environmental characteristics (Yang, 2010). Understanding environmental influences on current smoking is important from a public health perspective, particularly for formulating policy and designing and implementing effective interventions that take account of both environmental and individual influences on health behaviour (Twigg and Cooper, 2009). However, while there has been increasing attention to the role of place or context effects on smoking (Pearce et al., 2012), most smoking studies continue to examine individual-level correlates (Yang, 2010). Where environmental influences have been addressed these have mainly focused on the local neighbourhood scale. Consequently few studies have examined the association between state or regional factors and the likelihood of being a current smoker. With few exceptions (e.g., Hoffer and Pellilo, 2012; Morley and Pratte, 2013), this has been particularly true on how economic reliance on the tobacco industry has shaped local tobacco control policies and the incidence of smoking. The few studies that have been conducted have been largely confined to the

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United States and have shown how the tobacco lobby has been detrimental to tobacco control and a reduction of smoking rates in those states where the industry is most powerful. Such trends call for more research which adopts a political economy approach in order to gain a greater understanding of how special interest groups affect variations in tobacco control and smoking rates in different areas. Unfortunately such factors have tended to be neglected in the tobacco control policy literature and have seldom been investigated in a systematic empirical way (Bump and Reich, 2013). This is particularly true in China. While some studies have attempted to understand regional variations in the importance of the tobacco industry and the importance of different stakeholders in tobacco production and tobacco control (e.g., Li, 2012), none have attempted to link such factors to rates of smoking. This paper fills this research gap. It examines the importance of tobacco cultivation and cigarette manufacturing at the provincial level in China and the extent to which variations in the importance of the industry are related to provincial differences in smoking rates. Since China is the leading tobacco producer and manufacturer in the world (Hu, 2008; Food and Agricultural Organization (FAO), 2009), then greater insight into the links between provincial variations, particularly in tobacco's role in economic development and smoking outcomes, would seem to be a high priority. Knowing the extent of such variations and their significance in influencing smoking is important given the need for researchers to play a more important role in informing tobacco control programmes (Koplan et al., 2013).

In order to understand the extent of provincial variation in smoking in China the paper is structured as follows. First we review current work on regional effects on smoking paying attention to some of the possible pathways linking regional characteristics and smoking outcomes. Second, we provide a brief background on the structure of the tobacco industry in China and how this is shaped by key decision-makers at the national and provincial level. Third, we describe the study methodology and the contextual variables selected for analysis. This is followed by a discussion of results. In the final section of the paper we interpret these results within the wider body of contextual research on smoking and discuss some of the theoretical and policy implications of the study.

2. Regional contextual effects on smoking

Smoking is one of many health behaviours which are influenced by the context in which people live. While most studies of contextual or place effects have focused upon the neighbourhood as the unit of analysis, it is clear that environmental influences on health also operate at other spatial scales (Karvonen and Rimpelä, 1996). However, with the exception of the burgeoning research into income inequality and health outcomes, there has been little attention of how regional effects influence health behaviours such as smoking (Pampel, 2002). Chaix and Chauvin (2003), Chaix et al. (2004), for example, have noted that local neighbourhood effects have received far more attention than macro-effects which operate at a broader scale. They argue that while one might think that it is more relevant to define contextual effects at the local scale, where there will be greater population homogeneity, amongst urban neighbourhoods for example, contextual studies at higher levels of aggregation are also important as specific processes may operate at the level of these broader areas. In the smoking literature while some studies have examined the independent influence of regional differences in levels of deindustrialisation/economic development (e.g., Audureau et al., 2013; Chaix and Chauvin, 2003) or unemployment (Vuolo, 2012) on smoking overall little attention has been paid to what higher level effects should be important, at what spatial scales and why. The main exception to this trend has been in the income inequality and health literature where much stronger relationships between income inequality and health have emerged at

state/regional levels of aggregation compared to more localised levels of analysis. This finding is strongly suggestive of the role of state public policies as being a dominant force in the production of health inequalities (Dunn et al., 2005), including smoking (e.g., Diez Roux, 2001; Graham, 2001) compared to psychosocial interpretations reflecting more local factors.

Differences in national or regional public policies are likely to influence smoking in a number of ways. First differences in political culture may affect smoking rates through a weaker political commitment to smokefree policies. In the USA, for example, various types of state government policies have been consistently associated with political culture, with moralistic political cultures having the most interventionist governments and traditionalist political cultures the least. These cultures have been associated with different patterns of government intervention, levels of social inequality, as well as health outcomes (Sharkansky, 1969). Morley and Pratte (2013), for example, showed that Republican control of state legislatures was associated with lower excise taxes on cigarettes which in turn were significant predictors of state smoking rates.

Second, in federal political systems variations in state- or provincial-level anti-smoking legislation is also likely to influence community norms and the overall prevalence of smoking. In an early US study, which examined links between community social environments and attitudes to smoking, Ross and Taylor (1998) showed that pro-smoking attitudes were highest in states where libertarian values were important. In Iowa, for example, pro-smoking attitudes persisted due to a lack of policy enforcement at local levels and support for individual rights and freedoms. Similarly in Canada, Corsi et al. (2012) found that collective norms discouraging smoking in a community was the strongest contextual predictor of smoking while provincial-level factors, such as cigarette taxes and workplace bans, also played a role.

Third, while differences in national and local political cultures may be important in influencing variations in policy implementation, so too has been the impact of the tobacco industry. Not surprisingly, Ross and Taylor (1998), for example, showed that pro-smoking attitudes in different US regions were stronger in places economically reliant on the tobacco industry. In the United States, cross-state variation in spending on tobacco control also reflects the impact of local tobacco interests. For example, Hoffer and Pellilo (2012) indicate that geographic differences in tobacco control spending are negatively related to both the level of tobacco production as well as the level of campaign contributions from state tobacco lobbies. Also it has been shown that US states which are more economically reliant upon tobacco manufacturing (as measured by tobacco revenue of a percentage of state gross product) were more likely to have weaker smokefree laws (Morley and Pratte, 2013). As is the case in many other parts of the world, the tobacco lobby has been successful in increasing the number of states that have enacted state pre-exemption of stricter local tobacco control laws and prevented the passage of many policies, particularly those relating to more vigorous smoking bans (Givel and Glantz, 2001).

3. Structure of the tobacco industry in China

Much of the research outlined above has been conducted in high income countries with market economies and not in contexts such as China where the two state organisations, the State Tobacco Monopoly Administration (STMA) and the China National Tobacco Company (CNTC), are dominant monopolies. Consequently it is important to briefly outline the structure of the Chinese tobacco industry, its key stakeholders and their importance at national and provincial levels. It is argued that any analysis of regional variations in smoking in China must take account of the institutional context and the interactions between national and provincial stakeholders

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