The Effects of Changes in Family Social Capital on Health in Taiwan: An Examination of the Mediation Effect of Smoking Behavior

Yenhau Pan[1] and Nientsu Wang[2],*

[1] *College of Law, Minjiang University, Fuzhou, Fujian 350108, China*
[2] *College of Humanities, Minjiang University, Fuzhou, Fujian 350108, China*
Corresponding author. E-mail: alexpan0911@163.com

ABSTRACT

This study assesses the direct effect of changes in family social capital (FSC) on self-rated health (SRH) and its indirect effect through changes in smoking behavior. This study uses logistic regression and mediation analysis models to analyze the longitudinal data on 2,108 adult children in Taiwan. The findings show that respondents who maintain good relations with parents have a lower likelihood of poor SRH. The results find stable smoking exerting a detrimental effect on health. There is no evidence for the mediation effect of changes in smoking on the relationship between changes in FSC and SRH because of most of the insignificant relationships between changes in FSC and smoking. Health policy makers aiming to promote health and reduce the prevalence of smoking should understand the importance of a reciprocal relationship and the weak effects of FSC on smoking.

Keywords: Taiwan; Family social capital; Self-rated health; Smoking; Panel Study of Family Dynamics

1. INTRODUCTION

Previous studies indicated worse self-rate health (SRH) found in Western countries [1][2]. The increase in the proportion of reporting poor SRH is also observed in Taiwan [3]. Given that the positive association between SRH and individual-level social capital such as community participation and social trust within health literature [4][5][6][7], social capital may ameliorate the prevalence of worse SRH. To date, little attention has been paid to the importance of family social capital (FSC). More research concerning the relationship between FSC and health, as well as the mechanism through which social capital affects health is needed [8].

Coleman argues that individual-level FSC which is embedded in the structure of relationships and constitutes resources accessible to individuals can be divided into three forms: reciprocity, information channel, and effective sanction [9]. Reciprocity denotes situations where people do something for someone, who in turn feels obligated to reciprocate repay the favor someday. Information channels means information acquired through interpersonal relations. Multiple social contacts increase the frequency of health information exchange. Effective sanctions refer to informal social control to prohibit or encourage certain behaviors. Previous study has shown that reciprocity is of predictive of the quality of parent-child relationships [10]. Therefore, FSC is measured in terms of relation quality, social control and interaction which are similar to Morrow's concepts [11]. Among these forms, results have been consistently reported to show having a good relationship with parents

and frequently interacting with family members positively associated with good health [12][13]. However, the effects of parental surveillance and control seem to vary depending on the measured index of health [14][15]. Despite a body of literature that supports a positive relationship between social capital and health, most studies are cross-sectional, which makes it hard to rule out the likelihood of reverse causality. As such, this study uses longitudinal data to clarify the temporal relationship between FSC and health.

Research exploring how FSC influences health is rare. A common hypothesis is that social capital enhances or reduces health behaviors, which in turn promote health [5][16]. Poortinga [5] tested the hypothesis on the mediating role of health behaviors and indicates that social capital (e.g., civic participation and social trust) is linked to SRH, as well as to various health behaviors. Yet there is limited evidence to support the hypothesis that health behaviors mediate social capital and health. Given that the prior study tested neither the effects of FSC nor the significance of health-behavior mediation effects, this study is the first to address the issue by analyzing panel data.

There are three reasons to consider smoking as a mediator and its mediation effect may be manifested in this study. First, compared with daily alcohol intake and daily consumption of five portions of fruit and vegetable, the relationship between social capital and smoking is the strongest [5]. Next, the strong association between smoking and SRH is presented among the general population [5], rather than among older adults [17]. This current study, which uses data on general adults, may link SRH to smoking. Finally, SRH is a valid predictor of morbidity [18], and smoking is a major worldwide cause of mortality. Approximately 6 million people died of tobacco-related diseases per year worldwide while more

than 20,000 Taiwanese died of tobacco use [19]. Moreover, the prevalence of smoking (47.7%) was higher than alcohol consumption (31.2%) and betel nut chewing (10.4%) among Taiwanese workers [20]. To reduce the prevalence of smoking, analyzing which forms of family social capital related to smoking is needed. In a nutshell, this study aims to assess (i) whether changes in social capital influence SRH and (ii) whether changes in smoking mediate the relationship between changes in FSC and SRH, after taking into account other well-known covariates.

2. METHOD

2.1. Survey Data

This study used three waves of longitudinal data from Panel Study of Family Dynamics (PSFD) which employed a three-stage random sampling to collect data. Respondents who participated in 2005 (T1) and returned for the 4-year follow-up in 2009 (T2) provided the panel data. To test a temporal association, information on dependent variable in 2010 (T3) was collected from the same participants. At T1, 2,880 representative samples were surveyed (response rate=74.4%), while and 2,269 and 2,219 individuals were successfully interviewed at T2 and T3, respectively (retention rate: 79% in 2009 and 77% in 2010). The sampling, face-to-face survey and informed consent procedure were carried out by Academia Sinica of Taiwan.

2.2. Measures

2.2.1. Family social capital measures

Three variables were based on Coleman's concepts [9] and previous studies [12][13][15]. Relation quality measured the extent of individuals getting along with their mothers and fathers. The two items were based on a five-point scale. Social interaction assessed how often respondents joined in four types of social activities. Respondents had to decide on a scale from 0 ('never') to 2 ('often'). Parental control was evaluated by asking about the degree to which mothers or fathers exerted influence on respondents' learning and entering a higher school. Respondents were asked to respond a five-point scale. Results from the factor analysis showed three distinct factors that accounted for 63.5% and 64.4% of the item variance at T1 and T2, respectively. Subjects' answering with 'well' and 'very well' for both mothers and fathers was coded as 1, indicating good relations with their parents, while 'fair' to 'very poor' was coded as 0, representing not getting well with their parents. The response to parental control options, 'influential' and 'most influential' were coded as 1, denoting high levels of control, while other response options referred to low or medium levels of control.

Changes in relation quality included four categories: (I) keeping a good relationship; (ii) an 'improved relationship' (changes from not getting along with parents at T1 to getting along at T2); (iii) a 'deteriorated relationship' (changes from getting along with parents at T1 to not getting along at T2); and (iv) maintaining poor relations.

Four types of changes in parental control contained: (i) remaining at a high level; (ii) positive change; (iii) negative change; and (iv) remaining at a low/medium level. Changes in social interaction was assessed by subtracting T1 interaction summed scores from T2 interaction summed scores.

2.2.2. Smoking behavior measures

Smoking status assessed whether respondents identified themselves as current smokers, which was a valid indicator of self-reported smoking in large population studies [21]. Respondents were labeled as 1 for current smokers, i.e., they used tobacco at the time of the interview. Respondents who chose other options (e.g., an ex-smoker or someone who had never smoked) were labeled non-current smokers. Changes in smoking between 2005 and 2009 were categorized into four types: (i) stable non-smoking; (ii) taken up smoking; (iii) smoking cessation; and (iv) stable smoking.

2.2.3. Self-rated health measurement

SRH measured how respondents perceive current health. SRH was dichotomized into 'good' (good, excellent) and 'poor' (fair, poor, very poor). Good health was coded as 0, whereas poor health was coded as 1.

2.2.4. Control variables

Control variables include age, education, employment, family structure, house moving, and chronic disease (see Table 1).

2.3. Data Analysis

The current study applied an expectation maximization (EM) algorithm to impute the missing values of FSC via SPSS 22.0 due to more accurate estimates of EM than those of conventional methods. A total of 2,108 respondents were included the final analysis. The imputed result was highly similar to original one deleting missing values.

A logistic regression model was employed to analyze whether changes in social capital and smoking were associated with SRH over time. Model 1 included changes in relationship quality, social interaction parental control, and baseline SRH and control variables. Changes in smoking were added to Model 2. To address the second research question, this study used a mediation analysis

method (referred to as the KHB method), developed by Karlson, Holm, & Breen [22], to test the significance of mediation effects.

3. RESULTS

Table 1 shows the descriptive statistics of changes in FSC, smoking, SRH and covariates at baseline. The proportion with regard to current smoking decreased from 27.2% to 25.1% between 2005 and 2009. The proportion of respondents who had poor SRH increased from 56.9% to 62.8% over a 5-year period.

Table 2 analyzes the effects of changes in FSC and smoking on health. When adjusting for baseline SRH and covariates, respondents who stated they had a deteriorated relationship with parents or maintained a good relationship with parents were less likely to report poor SRH than those who maintained a poor relationship with parents (OR of 0.68 and OR of 0.65, respectively; Model 1). In Model 2, a stable smoker had significantly higher ORs for reporting poor health than a stable non-smoker. When a change in smoking behavior is included in Model 2, the effect of having a deteriorated relationship with parents becomes insignificant.

Table 1. Descriptive statistics of variables used in this study

Characteristics	T1(2005)	T2(2009)	T3(2010)
Relation quality(N, %)			
Not getting well with parents	524 (24.9)*	579 (27.5)	
Getting well with parents	1584 (75.1)	1529 (72.5)	
Social interaction(M, SD)	6.58 (1.53)*	6.35 (1.59)	
Parental control (N, %)			
Low or medium level	1550 (73.5)	1513 (71.8)	
High level	558 (26.5)	595 (28.2)	
Smoking			
Current non-smoker(N, %)	1534 (72.8)*	1579 (74.9)	
Current smoker	574 (27.2)	529 (25.1)	
Self-rated health (N, %)			
Poor health	1200 (56.9)**		1324 (62.8)
Good health	908 (43.1)		784 (37.2)
Gender(N, %)			
Male	1048 (49.7)		
Female	1060 (50.3)		
Age (N, %)			
29-44	729 (34.6)		
45-60	840 (39.8)		
60+	539 (25.6)		
Education (N, %)			
Basic education	815 (38.7)		
Middle education	798 (37.9)		
Higher education	495 (23.4)		
Job status(N, %)			
Unemployment	635 (30.1)		
Employment	1473 (69.9)		
Family structure (N, %)			
Non-intact family	403 (19.1)		
intact family	1705 (80.9)		
House moving (N, %)			
House non-mover	2033 (96.4)		
House mover	75 (3.6)		
Chronic disease (N, %)			
None	1857 (88.1)		
At least one disease	251 (11.9)		

Note: * (p <.05) represents significant difference in relation quality, social interaction, and smoking between T1 and T2. ** (p <.01) represents significant difference in SRH between T1 and T3.

Table 2. The influence of changes in family social capital and smoking on self-rated health

Predictors	Self-rated health (poor health)	
	Model 1	Model 2
	OR (95% CI)	OR (95% CI)
Relation quality		
Maintaining a poor relationship	1	1
Improved relationship	0.79 (0.53-1.17)	0.80 (0.54-1.19)
Deteriorated relationship	0.68 (0.46-0.98)	0.69 (0.47-1.01)
Remaining a good relationship	0.65 (0.49-0.87)	0.66 (0.50-0.88)
Social interaction	0.97 (0.92-1.03)	0.98 (0.92-1.03)
Parental control		
Remaining low/medium	1	1
Positive change	1.02 (0.78-1.33)	1.02 (0.78-1.34)
Negative change	0.99 (0.71-1.23)	0.93 (0.70-1.23)
Remaining high	0.74 (0.55-1.01)	0.75 (0.55-1.03)
Smoking		
Stable non-smoking		1
Take-up smoking		1.20 (0.72-2.01)
Smoking cessation		1.16 (0.75-1.78)
Stable smoking		1.44 (1.09-1.90)

Note. Models 1 and Model 2 adjusted for covariates.

4. DISCUSSION

This study uses longitudinal data sets to analyze the effect of changes in FSC on SRH and how changes in FSC affect health through changes in smoking behavior. Although most cross-sectional studies view FSC as a crucial factor protecting against health problems [12] [13] [15], this study reveals that only maintaining a good relationship with parents benefits health. Prior to including changes in smoking behavior, the finding that a deteriorated relationship with parents lowers the likelihood of reporting poor health is unanticipated. A possible explanation could be that, as the deteriorated relationship is due to imbalance in reciprocity, every adult child giving more support to their parent reduces the extent of the caregiving burden [23], which, in turn, is associated with good health [24]. Filial piety, one of the relevant values in modern Chinese societies, makes it possible for any family member to provide elderly parents with more instrumental support and emotional care. However, the weak effect of a deteriorated relationship disappears in the final model.

The result that changes in social interaction are not related to SRH differed from that of the prior work, which found that fewer social interactions were associated with poor health in students in England [12]. Previous research, relying on cross-sectional design, cannot make casual claims. Perhaps a healthy respondent is more likely to engage in a variety of activities within family. In accordance with evidence from cross-sectional research [12][13], the non-significant impact of control on SRH is found in this study. The results suggest that quality of the relationship plays a more important role in promoting health than two other forms of social resources. The findings not only deepen the understanding of the health protection effects of relation quality based on Coleman [9],

but also extend the scope from the influence of relation quality on elder parents' wellbeing in Western countries [25] to on adult children' health in a non-Western country. A good relationship with parents represents a reciprocal relationship in which respondents are easily exposed to instrumental and emotional resources that promote health. The detrimental effect of smoking on health is as stated by these studies[5][26]. However, the finding that stable non-smoking improves SRH is inconsistent with the longitudinal study conducted showing that stable non-smoking does not affect baseline SRH, compared with stable smoking [26]. It is difficult to assess the effect of smoking behavior changes on health because of smoking and health measurements being conducted at the same time in their study.

The KHB mediation analysis shows that none of the indirect effects is significant. The non-significant indirect effect of changes in social capital, via smoking behavior changes, on SRH can be attributed to most of the insignificant relationships between changes in social capital and smoking. Different social meanings of tobacco, which vary at different life stages, could dilute the effect of relationship quality. For some adults, social smoking takes place because tobacco is sometimes viewed as a means of socializing with important others [27].

This study confirms that smoking does not mediate the relationship between FSC and SRH, which is similar to earlier research focusing on other forms of social capital [5]. Future research should further explore whether family-related social capital promote health through health-promoting behaviors such as eating a low-fat diet and regular exercise.

These findings are subject to several limitations. First, while the PSFD sample was selected to reflect the Taiwanese adult population, those aged below 28 were not included in the survey population. Therefore, the results can only be applied to adults aged over 29 years, rather than all adults aged over 18 years. Furthermore, this study does not consider other forms of FSC, including emotional support, instrumental support and family network, as categorized by Alvarez et al. [8]. Failure to include these variables in the analytic model may influence the estimates of the relation quality effect.

5. CONCLUSION

The results identify that, of the three forms of FSC, only maintaining a harmonious relationship with parents is beneficial for improving adult children's SRH. Stable smoking appears to result in poor health. Besides exploring Putnam's concept defining social capital as features of social organization, future researchers should pay more attention to the effects of FSC. This study finds most of family-related social capital measures failing to affect smoking. Thus, no mediation effect of changes in smoking on the association between changes in FSC and SRH is found. Health policy makers aiming to promote health and reduce the prevalence of smoking should understand the importance of a reciprocal relationship and the weak effects of FSC on smoking in an adult population as well as the social meaning of tobacco use in a given context.

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