Parental smoking, rejection of parental smoking, and smoking susceptibility and behaviours in Hong Kong adolescents

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Abstract

Introduction: We explored the role of rejection of parental smoking in the association between parental smoking and smoking in adolescents.

Methods: In a 2010-11 cross-sectional survey, 61810 Hong Kong secondary school students (mean age 14.6 years, 50.5% boys) reported their smoking (never, not susceptible; never, susceptible; ever, not current; current), paternal and maternal smoking, and whether they accepted paternal and maternal smoking (acceptance/rejection). We used multinomial logistic regression to estimate the odds ratios (ORs) and 95% confidence intervals (CIs) of students' smoking in relation to acceptance and rejection of parental smoking, compared with no parental smoking.

Results: The OR (95% CI) of "never, susceptible", "ever, not current", and "current", compared with "never, not susceptible", in relation to acceptance of paternal smoking was 1.81 (1.67-1.96), 2.46 (2.25-2.69), and 2.79 (2.51-3.10), respectively. The corresponding ORs for rejection were 0.70 (0.64-0.76), 1.23 (1.13-1.35), and 0.47 (0.40-0.56). The OR (95% CI) of "never, susceptible", "ever, not current", and "current", compared with "never, not susceptible", in relation to acceptance of maternal smoking was 2.05 (1.80-2.33), 2.57 (2.29-2.88), and 6.33 (5.39-7.44), respectively. The corresponding ORs for rejection were 0.85 (0.69-1.05), 1.59 (1.39-1.81), and 2.14 (1.71-2.68). No overlapping was observed between the 95% CIs for acceptance and rejection of paternal or maternal smoking.

Conclusions: While adolescent smoking was associated with parental smoking, especially in those who accepted parental smoking, the association was attenuated or reversed in those who rejected parental smoking.

Keywords: adolescent smoking; smoking prevention

Introduction

The association of parental smoking with smoking in adolescents is well-established (Avenevoli & Merikangas, 2003; Leonardi-Bee, Jere, & Britton, 2011), but the underlying mechanism is understudied (Avenevoli & Merikangas, 2003). Common explanations include easy access to cigarettes, imitative learning, and inherited genetic susceptibility to smoking, all of which imply direct influences (Avenevoli & Merikangas, 2003). A few studies, however, found mediation of the association by adolescents' perceived smoking norms (Chen et al., 2006), general attitude towards smoking (Harakeh, Scholte, Vermulst, de Vries, & Engels, 2004), and negative outcome expectation and perceived parental approval of smoking (Flay et al., 1994). These findings suggest that the association may be mediated by adolescents' smoking-related cognition.

We recently reported that, in a survey of Hong Kong adolescents in 2010-11, about half of those with a smoking parent rejected the parent's smoking, ie, considered it unacceptable (Chen, Ho, Wang, & Lam, 2016). In the present study, we used the survey data to explore the association between adolescent smoking and parental smoking stratified by acceptance or rejection of parental smoking, compared with no parental smoking. To our knowledge, this is the first study on how the association may vary by adolescents' attitude towards parental smoking or smoking-related cognition in general. The findings may help understand the underlying mechanisms and design adolescent smoking prevention programmes.

Methods

Data source

We analysed the cross-sectional survey data of 61810 students from 79 secondary schools collected in Hong Kong in 2010-11. The survey used a random sample of secondary schools stratified by the districts in Hong Kong, with school and student level response rates of 25.8% and 97.3%. Schools' non-participation was mainly due to administrative reasons, and these schools were similar to the surveyed schools in district, sex composition, and medium of instruction (Chi-square tests, Ps > 0.05) (Chen et al.,

2016). The survey was conducted in classrooms using an anonymous paper-and-pencil questionnaire. More detailed survey methods have been reported elsewhere (Leung, Ho, Wang, Lo, & Lam, 2015). Ethics approval was granted by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

Measurements

Students were asked in separate questions: "Do you think it is acceptable if your father/mother smokes?" with the options dichotomised as acceptance (very acceptable/acceptable) and rejection (unacceptable/very unacceptable) of paternal/maternal smoking. Paternal (yes/no) and maternal smoking (yes/no) were also reported.

Students were also asked "if one of your good friends offers you a cigarette, will you smoke it?" and "do you think you will smoke cigarettes in the next 12 months?" The options for both questions were "definitely not", "probably not", "probably will", and "definitely will". Those choosing "definitely not" for both questions were deemed not susceptible to smoking, and otherwise susceptible to smoking. Students also reported whether they have ever smoked (even one puff) and whether they smoked in the past 30 days (current smokers). To investigate the association of interest across progressing stages of smoking, we derived a 4-level variable to indicate students' smoking status: "never, not susceptible" (reference), "never, susceptible", "ever, not current", and "current". Smoking susceptibility strongly predicts future smoking in never smoking adolescents (Choi, Gilpin, Farkas, & Pierce, 2001; Pierce, Choi, Gilpin, Farkas, & Merritt, 1996).

Students also reported their sex, age (in years), perceived family affluence (relatively poor/poor to average/average/average to rich/relatively rich), and number of co-residing smokers (0/1/2/3/4/5 or more). With the numbers of co-residing people and parents who smoked, we derived a binary variable to indicate the presence of co-residing smokers other than parents (yes/no).

Analysis

We used multinomial logistic regression models to estimate the odds ratios (ORs) of students' smoking (4-level outcome variable) for study factors. We first estimated the ORs for paternal and maternal smoking (binary study factors). We then created two 3-level study factors with the levels being "no paternal/maternal smoking" (reference), "rejection of paternal/maternal smoking", and "acceptance of paternal/maternal smoking", and estimated the ORs for these study factors. We adjusted for maternal smoking in the analyses of paternal smoking, and adjusted for paternal smoking in the analyses of maternal smoking. We also adjusted for age, sex, perceived family affluence, co-residing smokers other than parents, and school clustering effect in all models. We used Stata 13.0 for analysis and set statistical significance at $P < 0.05$.

Results

Table 1 shows that the sample had a mean age (standard deviation) of 14.6 (2.0) years and 50.5% were boys. Smoking status was as follows: "never, not susceptible" 72.6%; "never, susceptible" 10.3%; "ever, not current" 11.3%; and "current" 5.8%. Paternal and maternal smoking was reported by 31.0% and 5.9%. Of those with parental smoking, rejection by student was 51.3% for paternal smoking and 49.2% for maternal smoking.

Table 2 shows that the smoking status of "never, susceptible", "ever, not current", and "current", compared with "never, not susceptible", were associated with both paternal (ORs 1.14-1.73) and maternal smoking (ORs 1.35-3.88). The associations were particularly strong in those who accepted paternal (ORs 1.81-2.79) and maternal smoking (ORs 2.05-6.33). However, in those who rejected paternal smoking, the ORs were reversed for "never, susceptible" (OR 0.70, 95% CI 0.64-0.76) and "current" (OR 0.47, 0.40-0.56), and attenuated for "ever, not current" (OR 1.23, 1.13-1.35). In those who rejected maternal smoking, the OR was reversed only for "never, susceptible" (OR 0.85, 0.69-1.05), and attenuated for "ever, not current" (OR 1.59, 1.39-1.81) and "current" (OR 2.14, 1.71-2.68). Compared with the ORs

associated with acceptance of parental smoking, the corresponding ORs for rejection were consistently smaller. The differences were statistically significant, indicated by the non-overlapped 95% CIs. The adjusted OR of ever smoking for one or two smoking parents, compared with no smoking parent, was 1.96 (not shown in tables). In addition, 33% of students had one or two smoking parents (not shown in tables). These statistics suggest that 24% of smoking initiation in Hong Kong adolescents was attributable to parental smoking, indicating a considerable role of parental smoking in perpetuating the smoking population.

Discussion

In line with the literature (Avenevoli & Merikangas, 2003; Leonardi-Bee et al., 2011), we found significant associations between adolescent smoking and parental smoking. The associations were particularly strong in the subgroups that accepted parental smoking. However, in the subgroups that rejected paternal smoking, the associations were reversed or attenuated; and in the subgroups that rejected maternal smoking, the associations were generally attenuated. The findings suggest that the positive effect of parental smoking on adolescent smoking may at least be ameliorated if parental smoking is rejected by adolescents. The inverse associations further suggest that paternal smoking, if rejected by adolescents, may even have opposite effects on adolescent smoking.

A few qualitative studies of children and adolescents with parental smoking showed their dislike of secondhand smoke and concern about the health consequences of parental smoking on both their parents and themselves (Rowa-Dewar, Amos, & Cunningham-Burley, 2014; Woodgate & Kreklewetz, 2012; Woods, Springett, Porcellato, & Dugdill, 2005). In one of these studies, adolescents even claimed that parental smoking caused emotional distress and affected parent-child relationships (Woodgate & Kreklewetz, 2012). About half of Hong Kong children living with one or more smokers reported tobacco-related unpleasant experience at home in the past 30 days (Chen, Ho, Au, Wang, & Lam, 2015). Therefore, parental smoking may cause perennial health concerns and negative experiences in adolescents

who reject their parents' smoking. This may make these adolescents particularly anti-smoking and even less likely to smoke than those who have no smoking parents and thus have not experienced any unpleasantness caused by parental smoking.

However, unlike rejection of paternal smoking, rejection of maternal smoking was not inversely associated with adolescent smoking. The reason for the difference is unclear. It should be noted, however, that Hong Kong has a strong social norm against female smoking, as is reflected by the large difference between the prevalence of paternal (31.0%) and maternal smoking (5.9%) in our sample. It may thus be speculated that adolescents within this context may reject maternal smoking because of their specific disapproval of female smoking rather than general disapproval of smoking behaviour. If so, this may have resulted in the increased risks of smoking in those who rejected maternal smoking.

To prevent adolescent smoking, parents should ideally quit smoking or at least avoid exposing children to secondhand smoke (Chassin, Presson, Rose, Sherman, & Prost, 2002; Farkas, Distefan, Choi, Gilpin, & Pierce, 1999; Wang, Ho, & Lam, 2011), but quit rates in adult smokers have been low and parents are difficult to reach and intervene with (Messer, Trinidad, Al-Delaimy, & Pierce, 2008). Our results suggest it may be possible to mitigate the pro-smoking effects of parental smoking by intervening with students, who are much easier to reach in large numbers. Further research is needed to explore intervention strategies that promote the rejection of parental smoking directly or indirectly. We have previously reported that rejection of parental smoking was associated with being certain about the harms of smoking (Chen et al., 2016), which suggests that communication of the harms should be included in health education. The education may also include correction of adolescents' potential misperceptions of smoking norms and recommendations for parents' tobacco-related communications (Wang, Ho, Lo, & Lam, 2011). Although health education is generally considered not very effective in smoking prevention (Pierce, White, & Emery, 2012), our findings suggest that, in settings like Hong Kong, where the more effective measures such as raising tobacco taxes and banning tobacco advertisements are in place (Pierce et al., 2012), health education may play an important role in preventing adolescent smoking.

The present study is limited by its cross-sectional design, which precludes causal inferences. Prospective studies are warranted. To conclude, while adolescent smoking was associated with parental smoking, especially in those who accepted parental smoking, the association was attenuated or reversed in those who rejected parental smoking.

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Table 1. Basic characteristics of the sample.

	N (%)[a]
Sex	
Girls	30585 (49.5)
Boys	31225 (50.5)
Mean age in years (standard deviation)	14.6 (2.0)
Perceived family affluence	
Relatively rich	4933 (8.0)
Average to rich	15269 (24.8)
Average	33175 (53.8)
Poor to average	6988 (11.3)
Relatively poor	1318 (2.1)
Co-residing smoker(s) other than parents	
No	54723 (89.0)
Yes	6762 (11.0)
Attitude towards paternal smoking (among those with paternal smoking)	
Acceptance	9317 (48.7)
Rejection	9830 (51.3)
Attitude towards maternal smoking (among those with maternal smoking)	
Acceptance	1865 (50.8)
Rejection	1807 (49.2)
Paternal smoking	
No	42620 (69.0)
Yes	19147 (31.0)
Maternal smoking	
No	58126 (94.1)
Yes	3672 (5.9)
Smoking status	
Never, not susceptible	44722 (72.6)
Never, susceptible	6315 (10.3)
Ever, not current	6963 (11.3)
Current	3598 (5.8)

[a] Number and proportion unless otherwise stated.

Table 2. Adjusted odds ratios (95% confidence intervals)[a] of adolescent smoking (4-level variable) related to parental smoking, and related to rejection and acceptance of parental smoking.

		Never, not susceptible (reference group)		
		Never, susceptible	Ever, not current	Current
	Paternal smoking			
	No	1	1	1
	Yes	1.14 (1.07,1.22) ***	1.73 (1.60,1.87) ***	1.44 (1.31,1.58) ***
Paternal smoking	Attitude towards paternal smoking			
No		1	1	1
Yes	Rejection	0.70 (0.64,0.76) ***	1.23 (1.13,1.35) ***	0.47 (0.40,0.56) ***
Yes	Acceptance	1.81 (1.67,1.96) ***	2.46 (2.25,2.69) ***	2.79 (2.51,3.10) ***
	Maternal smoking			
	No	1	1	1
	Yes	1.35 (1.21,1.51) ***	2.01 (1.82,2.21) ***	3.88 (3.32,4.53) ***
Maternal smoking	Attitude towards maternal smoking			
No		1	1	1
Yes	Rejection	0.85 (0.69,1.05)	1.59 (1.39,1.81) ***	2.14 (1.71,2.68) ***
Yes	Acceptance	2.05 (1.80,2.33) ***	2.57 (2.29,2.88) ***	6.33 (5.39,7.44) ***

*$p < .05$; **$p < .01$; ***$p < .001$.

[a] All analyses were adjusted for age, sex, perceived family affluence, co-residing smokers other than parents, and school clustering effect. In addition, analyses of paternal smoking were adjusted for maternal smoking, and vice versa.