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Smoking initiation among Mexican heritage youth and the roles of family cohesion and conflict

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Abstract

Purpose—High levels of family conflict increase the risk for early smoking initiation and smoking escalation among adolescents, while high levels of warmth and cohesion in the family are protective against smoking initiation. However, little is known about the associations between changes in family function during adolescence on subsequent smoking initiation among Mexican heritage adolescents.

Methods—In 2005-06, 1,328 Mexican heritage adolescents aged 11 to 14 years enrolled in a cohort study to examine non-genetic and genetic factors associated with cigarette experimentation. In 2008-09, 1,154 participants completed a follow-up. Multivariate logistic regression models were computed to prospectively examine associations between smoking behavior assessed in 2008-09 and changes in family cohesion and family conflict assessed in both 2005-06 and 2008-09, controlling for gender, age, and linguistic acculturation, positive outcome expectations associated with smoking, as well as friends and family smoking behavior.

Results—Overall 21% had tried cigarettes by 2008-09. Consistently low levels of family cohesion (OR=3.06; 95% CI: 1.38-6.73) and decreases in family cohesion (OR=2.36; 95% CI: 1.37-4.07), as well as consistently high levels of family conflict (OR=1.74; 95% CI: 1.08-2.79) and increases in conflict (OR=1.87; 95% CI: 1.19-2.94) were independent risk factors for smoking initiation among Mexican heritage youth.

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Implications and Contributions: This longitudinal study identifies changes in family cohesion and family conflict, and examines their impact on smoking among Mexican heritage adolescents, a largely understudied population. It contributes to the existing literature by emphasizing the cultural norm of “*familismo*” through the protective effects of family cohesion on adolescent smoking behavior.

Conclusions—Our findings suggest that family cohesion protects against adolescent smoking while family conflict increases the risk for smoking. Therefore intervention programs for adolescents and parents could focus on enhancing family bonding and closeness, which is protective against smoking initiation.

Keywords

Family cohesion and conflict; Smoking; Adolescents; Mexican heritage

Introduction

According to the Youth Risk Behavior Surveillance System survey, nationwide about 41.1% of adolescents have tried cigarettes [1]. This is a concern because experimenting with cigarettes in early adolescence is associated with heavy smoking in later adolescence [2] and adulthood [3]. In Texas, rates of experimentation with cigarettes are higher among Hispanic youth, the majority of whom are of Mexican heritage, compared to youth from all other minority groups [1]. Of concern, Mexican heritage adolescents, including youth born in either the United States or Mexico, not only comprise the majority of the Texas population under the age of 18, they also are the most rapidly growing population in the United States [4, 5].

The concept of *familismo*, which refers to loyalty, reciprocity, and solidarity towards the family, [6] and *respeto*, which refers to maintaining hierarchical respectful relationships based on age, gender, and social status, [7] are critical to understanding the role of family functioning on the behavioral outcomes of Mexican heritage youth. Within the Mexican American cultural context, the overall levels of warmth and discipline are as important as the parent's individual behavior [8]. Family cohesion is often used as a proxy for *familismo* [9] and previous studies highlight that family cohesion serves as a buffer against substance use [10-12]. In contrast, high levels of family conflict are associated with increased risk for substance use as well as an increase in smoking levels among adolescents [12, 13].

Mexican heritage families residing in the United States can comprise family members born in Mexico as well as members born in the United States who have resided in the United States for varying numbers of generations; such varying levels of acculturation within the family can challenge cultural norms to create tension and conflict. As children reach adolescence their need for autonomy and independence increase, which frequently results in changes in the parent-child relationship [14]. Moreover, among Mexican heritage youth who experience adolescence in a country such as the United States that promotes individualism, the ways in which autonomy and independence manifest could serve as challenges to traditional family norms of *familismo* and *respeto* that are promoted within the Mexican culture, resulting in lower levels of family cohesion [14]. These difficulties can be compounded in immigrant families as economic hardships, inadequate access to parenting resources, and limited access to the larger family structure may further affect family relations [15] to increase conflict.

Considering that Mexican heritage families account for three quarters of the Hispanic population growth in United States [4], it is important to examine and understand how

changes in family factors affect adolescent smoking behavior in order to better plan and design interventions to prevent Mexican heritage adolescents from initiating smoking. Yet to date, while few longitudinal studies have examined the impact of changes in family functioning on adolescent outcomes [16-18] to the best of our knowledge, none have assessed the role of such changes on smoking initiation among Mexican heritage adolescents. Thus the main aim of this study was to prospectively examine associations between perceived changes in two aspects of family functioning (family cohesion and conflict) over an average of two and a half years, and incident smoking.

Methods

Study Population

The participants of this study are members of a cohort established in 2005-06 when the participants were 11-to-14 year old adolescents. Potential participants were identified from a population-based cohort of Mexican American households in Houston, Texas, referred to as the Mexican American Cohort Study (MACS), maintained by the Department of Epidemiology at The University of Texas M. D. Anderson Cancer Center (UTMDACC). A detailed description of the MACS recruitment methodology has been published [19]. Briefly MACS participants self-identified as Mexican-American and were recruited through random-digit telephone dialing, block-walking (i.e., recruiting door to door in selected neighborhoods), intercept (such as at health fairs, community centers, and local health clinics), or networking through already enrolled participants. Roughly 3,000 households with age-eligible youth were identified from the MACS cohort. A total of 1,425 parents or legal guardians of these youth were contacted; 93.2% agreed to enroll their child.

Home interviews were scheduled; a pair of bilingual (English and Spanish) interviewers visited each household and obtained written informed consent from the child's parent/legal guardian and informed assent from the child prior to enrolling the child. A total of 1,328 participants responded to the surveys at baseline in 2005-06 and 1,154 completed the same survey at follow-up in 2008-09, on average 30 months later. On both occasions, data were collected in the home using a personal digital assistant (PDA) following identical procedures. There was a 13.1% loss-to-follow-up. The institutional review board at UTMDACC approved all aspects of this study.

Measures

Dependent Variable. The outcome variable of interest for this prospective analysis, “trying cigarettes after baseline”, was assessed at follow-up and based on responses to three measures: (a) “Have you ever smoked a whole cigarette?”, (b) “Have you ever tried a cigarette, even a puff?” [20] as well as (c) the Minnesota Smoking Index [21]. Adolescents who responded “yes” to either of the first two questions or indicated any smoking on the Minnesota Smoking Index items were categorized as having “tried cigarettes after baseline.” Adolescents who reported that they had never smoked at baseline or follow-up were classified as “never tried”. The bogus pipeline was used to increase the validity of self-reported smoking status [22]. Specifically, participants were informed that they would be asked to provide a saliva sample, and told it might be used to validate their smoking status.

Main Independent Variable. The main independent variables of interest, family functioning, were assessed at both baseline and follow-up using the Family Life Questionnaire (FLQ) [23, 24] scale. The factor structure of the FLQ was validated among this cohort of Mexican heritage adolescents and the adapted scale was used in this analysis [25]. The FLQ was used to assess two aspects of family functioning namely, family cohesion and family conflict. Adolescents answered items on a four-point Likert scale ranging from “strongly agree” (3) to “strongly disagree” (0). Responses were averaged to create a summary score (Cronbach's alpha=0.69). The family cohesion scale included four items (e.g. “In my family, we really help and support one another”) and the family conflict scale included four items (e.g. “We don’t often fight in my family”) (see Table 1).

Using a median split, categorical variables (“low” and “high”) were created for family cohesions and conflict at both baseline and follow-up. A new variable with four categories, reflecting change over time in family functioning, was created next. Those who were low on the scale at baseline and follow-up were categorized as “low baseline-low follow-up”. Accordingly, the other categories were “low baseline-high follow-up”, “high baseline-low follow-up”, and “high baseline-high follow-up.” Based on the literature review [10-13], for family cohesion “high baseline-high follow-up” served as the reference category, while for family conflict, “low baseline-low follow-up” was the reference category since these qualities have been found to be protective against smoking.

Control Variables. Control variables included in this analysis were age, sex, parental education, positive outcome expectations, parental smoking, peer smoking, and acculturation, all assessed at the baseline. Other than age, positive outcome expectations, and acculturation, which were continuous variables, all other variables were categorical. Parental education was assessed using four categories “less than high school”, “some high school”, “completed high school”, and “more than high school”. Positive outcome expectations, which are the perceived positive consequences of engaging in a certain behavior, in our case smoking, [26] were assessed using a seven-item (e.g. “I think smoking would be relaxing”), four-point Likert scale (response ranged from “Strongly Disagree” to “Strongly Agree”). The score on all items was averaged to create a summary score (Cronbach's alpha=0.88). Parental smoking, was assessed based on adolescents’ responses to two items that assessed if their father and mother smoked (response categories were “Yes” or “No”). Participants who replied “no” to both questions were categorized as “neither parent smokes”, which served as the reference category. Likewise, peer smoking was assessed by adolescents’ self-reports to questions that assessed the number of close friends who smoked. Response categories included “none”, “a few”, “some”, “most”, and “all”). Participants who reported none of their friends smoke were categorized as “no peer smokes”, which served as the reference category. Linguistic acculturation was assessed using four items that ascertain language used when reading, speaking at home, speaking with friends, and thinking [27]. Responses were made on a five-point scale ranging from “only Spanish” to “only English” and were averaged to create a summary score (Cronbach's alpha=0.92). Higher scores reflect more use of English.

Data Analysis

Chi-square tests were used to examine the relation between the outcome variable, trying cigarettes after baseline, and categorical covariates, while Student's t-tests were used to examine associations between trying cigarettes after baseline and the continuous covariates. We used a prospective study design to examine associations between the covariates described above, which were assessed in 2005-06, and the outcome, incident smoking which was assessed in 2008-09, using logistic regression models. Since the aim of the study was to examine associations between change in levels of family cohesion and smoking, as well as levels of family conflict and smoking, logistic regression models were built separately for the two main independent variables of interest (i.e. family cohesion and family conflict). The main independent variable of interest was entered systematically into the model, along with the control covariates that demonstrated a significant association with the outcome ($p < 0.05$). Orthogonal polynomial contrasts were used to test for linearity of the categorical independent variables [28]. Odds ratios (OR) and associated 95% confidence interval (CI) were calculated. All analyses were conducted using Statistical Package for Social Sciences (version 17.0).

Results

Descriptive Analysis. A total of 1,154 participants provided data at the 2008-09 follow-up, conducted on average 30 months ($SD = 5.14$ months) after baseline. Of these, 22 participants had missing data on smoking status and 24 participants had missing data on one of the covariates. Since trying cigarettes after baseline was the outcome of interest, the 134 participants who had tried smoking at baseline were removed from the analysis. Thus, the final sample size for the analysis was 974 adolescents.

Results from the descriptive analyses are presented in Table 2. Overall, the results indicate that those who had tried cigarettes after baseline were more likely to be boys ($\chi^2 = 24.23$, $df = 1$, $p < 0.001$), older adolescents ($t = -6.54$, $df = 972$, $p < 0.001$), hold more positive outcome expectations ($t = -5.13$; $df = 282.07$, $p < 0.001$), have some peers who smoke ($\chi^2 = 79.02$, $df = 1$, $p < 0.001$), at least one parent who smokes ($\chi^2 = 15.25$, $df = 1$, $p < 0.001$), and higher levels of linguistic acculturation ($t = -2.177$, $df = 971$, $p = 0.03$) compared to those who never tried smoking. There were no differences in parental education between the two groups ($\chi^2 = 0.73$, $df = 3$, $p = 0.87$). With regards to changes in parenting from baseline to follow-up (see Table 2), more participants who had tried cigarettes after baseline reported low levels of family cohesion at baseline and at follow-up or reported a decrease from high levels of family cohesion at baseline to lower levels at follow-up ($\chi^2 = 16.35$, $df = 3$, $p = 0.001$) than those who had never tried smoking. In contrast, more participants who had tried cigarettes after baseline reported high levels of conflict in the family at both baseline and follow-up or an increase in conflict from low at baseline to high at follow-up ($\chi^2 = 18.46$, $df = 3$, $p < 0.001$) compared to their counterparts.

T-test results indicated that those who tried smoking cigarettes after baseline reported lower levels of family cohesion (baseline $t = 3.11$, $df = 972$, $p < 0.001$; follow-up $t = 5.64$, $df = 972$, $p < 0.001$), and higher levels of conflict (baseline $t = -2.87$, $df = 972$, $p < 0.001$; follow-up $t =$

-3.71, $df=972$, $p<0.001$), compared to their peers who had not tried cigarettes at either baseline or follow-up (see Table 3).

Logistic regression models. The results of the two logistic regression models are presented in Table 4 and 5. Collinearity tests indicated that none of the variables in the model were collinear. In both models, boys, adolescents who were older, those who held positive outcome expectations related to smoking, had peers who smoked, and had at least one parent who smoked were more likely to have tried smoking after baseline ($p<0.01$). Acculturation was not associated with trying smoking in either model (see Tables 4 and 5). With respect to changes in family cohesion and conflict, both were significantly associated with smoking after baseline. Specifically, consistently low levels of family cohesion at baseline and follow-up ($OR=3.06$, 95% $CI=1.38-6.73$) as well as a decrease in the level of family cohesion from high at baseline to low at follow-up were significantly associated with smoking after baseline ($OR=2.36$, 95% $CI=1.37-4.07$) (see Table 4). With regards family conflict, both a change from low at baseline to high at follow-up ($OR=1.87$, 95% $CI=1.19-2.94$) and high levels of conflict at both time points were significantly associated of trying cigarettes after baseline ($OR=1.74$, 95% $CI=1.08-2.79$) (see Table 5).

Discussion

After controlling for several key risk factors associated with smoking initiation, we found that consistently low levels of family cohesion and a perceived decrease in family cohesion over roughly a two and a half year period were significantly associated with smoking uptake among those who had never smoked at baseline. In addition, an increase in family conflict as the adolescent grew older and a steady level of high conflict in the family were significantly associated with smoking uptake among never smokers. Of note, the associations were maintained after simultaneously adjusting for age, gender, positive outcome expectations associated with smoking, peer and parental smoking behavior, which all demonstrated significant relationships in the expected directions, with smoking initiation. Acculturation, however, did not maintain a significant association with smoking initiation. These findings contribute to previous research in three ways. They highlight links between adolescent smoking initiation and perceived family functioning, using a prospective design to examine changes in family cohesion and family conflict over 30 months, among a largely understudied population, Mexican heritage youth, which constitute the largest and fastest growing subgroup among Hispanics in United States [4].

Previous studies have highlighted the positive impact of family cohesion in preventing adolescent substance use such as cigarettes, alcohol, marijuana [10-12]. Our findings are consistent with the literature on the long-term impact of family cohesion on future smoking in adolescents. Hill et al. [29] noticed a decline in family bonding as the adolescent grew older and suggested that family cohesion seems to be critical at the early years in preventing smoking initiation. The results of our study are noteworthy because they confirm and extend our understanding of the relationships between family cohesion as well as changes in family cohesion over time and the uptake of smoking among those who have never tried. Specifically, if levels of family cohesion are low in the family during adolescence or decline as the adolescent grows older, the risk of trying cigarettes increases.

Adolescence is frequently accompanied by a period of heightened conflict in the family, as children demand independence to affirm their identity and challenge parental authority potentially; in the United States, Mexican heritage adolescents may adopt the host country's values and beliefs faster than their parents, which could result in increasing conflict between parents and child [12]. Thus both increasing age and acculturation can lead to low levels of family cohesion, and subsequent associated decreases in family communication could result in elevated levels of conflict [30]. In addition, children's appraisals of family conflict tend to differentially impact their psychological adjustment [31] and as children reach adolescence these perceptions about conflicts can alter and impact their response to family conflicts. Consistent with this notion, we found that a perceived increment in family conflict was significantly associated with smoking initiation among those who had not smoked at baseline. Increasing levels of parent-child conflict arising from weakened parent-child bonds can serve to reduce the impact of conventional authority that parents hold in Mexican heritage families and thereby predispose adolescents to rebelliousness, subsequent delinquent behavior and substance use [32].

Of note, linguistic acculturation was not directly associated with smoking behavior, nor did its inclusion in the multivariate models attenuate the relationship between family cohesion and smoking initiation or family conflict and smoking initiation. This suggests that linguistic acculturation is neither directly linked, nor indirectly via family functioning, to smoking initiation. Our sample was drawn from predominantly Mexican heritage communities and in such communities strong cultural values are maintained despite linguistic acculturation due to the protective effects of the ethnic enclave [33, 34]. Indeed the participants in our sample reported significantly lower rates of cigarette experimentation than Hispanic youth do overall in Texas [1], which underscores the possibility that the influence from *familismo* and *respeto* could outweigh the influence from acculturation [12]. However it is equally possible that behavioral aspects of acculturation, such as food preferences or identification with national holidays, would serve as a better proxy for the acculturative pressures youth experience, and might be more closely linked to smoking behavior than linguistic acculturation.

In light of the findings of our study, intervention programs especially those targeting families with high levels of conflict could emphasize conflict resolution training to develop communication and problem-solving skills for parents and adolescents. Family cohesion is thought to buffer the effects of acculturation on adolescents [35] and thus programs that incorporate the cultural norms of *familismo* and *respeto* could serve to protect adolescents from engaging in health compromising behaviors, such as smoking, as they adapt to the host culture.

Some strengths of the study are that we used longitudinal data to identify the links between family factors and incident smoking in adolescents. The participants belong to a large ethnically homogenous and predominantly low-income sample of Mexican heritage youth, which is an understudied population. The participants were drawn from a population based cohort and included almost equal number of boys and girls. The use of a PDA to collect data to read and answer the questions without the risk of being overheard by others helped to assure confidentiality of the participant's responses. The high retention rate (87% of the

youth provided data at baseline and follow-up) and very little missing data (about 3%) are important strengths of the study.

A limitation of this study stems from the homogenous nature of participants; the results may not generalize to other ethnic backgrounds. Self-reported smoking status was not biochemically validated, so the possibility of under reporting smoking levels cannot be overlooked. The bogus pipeline method was adopted to potentially prevent incorrect reporting of smoking behavior. The validity of self-reported data increases if participants believe they may be asked to provide a biological sample [36], which was the case in our study. The loss of power and data resulting from categorizing the continuous variables cannot be disregarded. We used a median split to divide the sample in two groups and created an ordinal level change variable. Streiner [37] suggests if variables in the study deviate from normality then dichotomizing or categorizing them would be a parsimonious way of analyzing the data. An assessment of normality in AMOS (version 17.0) indicated that the independent variables were non-normal with a critical ratio of 45.372. In the absence of standard cutoff points, the most common approach to categorize the variables is to use the median split [38], which was adopted for this study. Using a median split, nevertheless, makes the categories sample dependent and may limit the generalizability of the study. Despite categorization and the potential loss of power and data, we found important associations between family functioning and trying cigarettes among adolescents. In addition, to the impact of family factors on smoking, it is also possible that youth smoking influences parenting behavior, but it was beyond the scope of this study to examine reverse associations.

Conclusion

In conclusion, the findings of this prospective study suggest that perceived changes in family cohesion and conflict influence Mexican heritage adolescents' decisions to smoke. Of note, our results are similar to those found in other ethnic groups and lend support to the notion that certain parenting predictors may be universally associated with smoking behavior among adolescents. Given the central and protective role that family plays within the Mexican culture, family-based smoking prevention interventions are culturally appropriate and therefore may be particularly effective among Mexican heritage youth and their families.

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List of Abbreviations

MACS	Mexican American Cohort Study
UTMDACC	The University of Texas M. D. Anderson Cancer Center
OR	Odds Ratio
CI	Confidence Interval
Df	Degrees of freedom

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Table 1

The Family Life Questionnaire Scale Items Assessing Family Cohesion and Family Conflict

Item Description	Strongly Disagree	Disagree	Agree	Strongly Agree
Family Cohesion				
1. In my family we really help and support one another.				
2. In my family we are full of life and good spirits				
3. My family always does things together.				
4. We really get along well with each other.				
Family Conflict				
5. We don't often fight in my family.				
6. In my family we hardly ever lose our tempers				
7. In my family we never hit each other.				
8. In my family we don't often criticize each other.				

Table 2

Participant characteristics by smoking status after baseline (N=974)

Variables	Never Tried, n (%)	Tried Cigarettes, n (%)	p-value
Overall	769 (79.0)	205 (21.0)	
Sex			< 0.001
Males	339 (44.1)	130 (63.4)	
Females	430 (55.9)	75 (36.6)	
Baseline age, M (SD)	11.75 (0.80)	12.17 (0.86)	<0.001
Parental education			0.87
Less than high school	264 (36.7)	69 (36.3)	
Some high school	200 (27.8)	58 (30.5)	
Completed high school	127 (17.6)	30 (15.8)	
More than high school	129 (17.9)	33 (17.4)	
Acculturation, M (SD)	3.48 (0.86)	3.62 (0.81)	0.03
Positive outcome expectations, M (SD)	1.19 (0.34)	1.34 (0.41)	<0.001
Peer smoking			< 0.001
No peer smokes	716 (93.1)	145 (70.7)	
At least one peer smokes	53 (6.9)	60 (29.3)	
Parental smoking			< 0.001
Neither parent smokes	552 (71.8)	118 (57.6)	
At least one parent smokes	217 (28.2)	87 (42.4)	
Change in family cohesion			0.001
Low at BL-Low at F/U	21 (2.7)	14 (6.8)	
Low at BL-High at F/U	51 (6.6)	12 (5.9)	
High at BL-Low at F/U	58 (7.5)	28 (13.7)	
High at BL-High at F/U	639 (83.1)	151 (73.7)	
Change in family conflict			< 0.001
Low at BL-Low at F/U	433 (56.3)	85 (41.5)	
Low at BL-High at F/U	122 (15.9)	44 (21.5)	
High at BL-Low at F/U	117 (15.2)	32 (15.6)	
High at BL-High at F/U	97 (12.6)	44 (21.5)	

BL=Baseline; F/U: Follow-Up; M: Mean; SD: Standard Deviation

Table 3

Mean levels of family cohesion and family conflict by follow-up smoking status, at baseline and follow-up

	Baseline		p-value
	Never Tried (n=769) M (SD)	Tried Cigarettes (n=205) M (SD)	
Family cohesion	8.86 (1.90)	8.40 (1.80)	< 0.001
Family conflict	5.22 (2.20)	5.71 (2.18)	< 0.001

	Follow-up		
Family cohesion	8.66 (1.85)	7.81 (2.11)	< 0.001
Family conflict	5.25 (2.19)	5.89 (2.21)	< 0.001

Table 4

Effect of change in family cohesion on trying cigarettes after baseline (N=974)

Variable	Odds Ratio	95 % CI	p-value
Age	1.53	1.24-1.88	<0.001
Male	2.49	1.77-3.58	<0.001
Positive outcome expectations	2.38	1.55-3.65	<0.001
At least one peer smokes	3.83	2.46-6.03	<0.001
At least one parent smokes	1.75	1.23-2.49	0.002
Acculturation	1.11	0.91-1.36	0.31
Change in family cohesion			
Low at BL-Low at F/U	3.06	1.38-6.73	0.06
Low at BL-High at F/U	0.91	0.45-1.87	0.80
High at BL-Low at F/U	2.36	1.37-4.07	0.002
High at BL-High at F/U	Ref	Ref	-

BL=Baseline; F/U: Follow-Up; CI=Confidence Interval

Table 5

Effect of change in family conflict on trying cigarettes after baseline (N=974)

Variable	Odds Ratio	95 % CI	p-value
Age	1.52	1.23-1.86	<0.001
Male	2.36	1.67-3.34	<0.001
Positive outcome expectations	2.34	1.53-3.59	<0.001
At least one peer smokes	3.68	2.34-5.77	<0.001
At least one parent smokes	1.64	1.16-2.34	<0.01
Acculturation	1.12	0.92-1.37	0.26
Change in family conflict			
Low at BL-Low F/U	Ref	Ref	-
Low at BL-High at F/U	1.87	1.19-2.94	<0.01
High at BL-Low at F/U	1.36	0.82-2.30	0.23
High at BL-High at F/U	1.74	1.08-2.79	0.02

BL=Baseline; F/U: Follow-Up; CI=Confidence Interval