Research Paper: Parent-Child Relationship and Smoking Among College Students: Role of Parents in Females' and Males' Smoking Behavior

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ABSTRACT

Objective: Youth smoking has long been a major concern at individual, familial, and national levels. The purpose of the current study was to investigate the role of parent-child relationship in the smoking behavior and smoking intensity among college students. We also aimed to investigate gender-specific variations in the association between mother-child and father-child relationships and smoking behavior and its intensity among female and male college students.

Methods: The sample consisted of college students (N=242: 142 smokers, 99 nonsmokers) who were selected using snowball sampling method among the students of Guilan University. Participants completed the parent-child relationship survey and Fagerstrom Test for Nicotine Dependence. Binary and multinomial logistic regressions were used for analyzing.

Results: Results showed that mother-child relationship, but not father-child relationship, was the significant predictor of smoking status. Also, mother-child relationship could predict low to moderate levels of dependence on nicotine. Finally, among male students, mother-child relationship was the significant predictor of smoking. Neither mother-child nor father-child relationships were the significant predictors of smoking status among female students.

Conclusion: Further research is needed to clear our understanding of gender-specific correlates of smoking among youth.

1. Introduction

The tobacco epidemic is one of the most important public health threats the world has ever faced, and smoking among young people has been especially a major concern at the individual, familial, and national level. Research has shown that although smoking initiation primarily occurs during adolescence years, many young adults may also develop their smoking habits during their college years (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2005; Everett et al., 1999). This concern is compounded by the fact that younger smokers (18 to 29 y) do not heed smoking-associated health

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warnings (Kviz, Clark, Crittenden, Warnecke, & Freels, 1995) and try cigarette despite the clear evidence on its adverse effects on health (Von Ah et al., 2005). These findings suggest an urgent need for investigating contributors of smoking among youth and providing preventive programs at universities.

According to the literature, family factors are critical determinants of smoking among youth. In his social control theory, Hirschi (1969) suggested that youth participate in delinquency due to the lack of affective attachments to their parents. In his theory, children will adopt and adhere to pro-social norms where there are stronger bonds between them and their parents. Consistent with this claim, social-psychological theories suggest that lack of family bonding leads to spending more time with peers, rejection of conventional norms, contributing in delinquent behaviors such as smoking, and finally more positive attitudes toward smoking (Petraitis, Flay, & Miller, 1995). Based on evidence, healthy parent-child communication and sufficient parental monitoring are protective factors against adolescence smoking (Mott, Crowe, Richardson, &, Flay, 1999; Simons-Morton et al., 1999). In general, adolescents who report positive family relationships, including greater perceptions of parental concern, support, and communication, are less likely to smoke (Shakib et al., 2003; Simons-Morton et al., 1999; Pederson, Koval, McGrady, & Tyas, 1998).

In line with this theoretical framework, various studies have shown the associations between youth smoking and different family factors, such as parenting style and strategies (Wang, Krishnakumar, & Narine, 2014; Piko & Balazs, 2012), warmth and the quality of the parent-child relationship (Roy, 2009; Johnston & Thomas, 2008; Shakib et al., 2005; Miller & Volk, 2002), family structure and divorce (Kristjansson, Sigfusdottir, Allegrante, & Helgason, 2009; Griesbach, Amos, & Carrie, 2003; Miller & Volk, 2002), parents attitudes and reaction towards smoking (Kristjansson, Sigfusdottir, James, Allegrante, & Helgason, 2010; Yazici, 2008), parents and sibling smoking (Scherrer et al., 2012, Weiss & Garbanati, 2004; Shakib et al., 2003; Miller & Volk, 2002; Tyas & Pederson, 1998), and perceived family life (Yazici, 2008; Johnston & Thomas, 2008; Glendinning, Shucksmith, & Hendry, 1997).

Despite the relative support for family factors, empirical findings have not been always consistent. In other words, although some studies have found strong relationships between family factors and later smoking or substance use, some studies have reported weak (Sampson & Laub, 1995; Conrad, Flay, & Hill, 1992) or insignificant (Von Ah et al., 2005) associations. For example, Von Ah et al. (2005) reported that familial emotional and social support did not significantly reduce cigarette smoking behavior among college students. In another study, Chassin, Presson, Sherman, Corty and Olshavsky (1984) found that parental control, parental supportiveness, and parental expectation were the weak predictors of cigarette smoking. Miller and Volk (2002) attributed many of these null findings to unreliable single item measures of family relationships used in most research. On the other hand, Darling and Cumsille (2003) suggested that transitional nature of adolescence, complexity, and multidimensionality of family forms and influences, and interrelationships of family influences with other key developmental contexts are the main 3 dilemmas that affect researchers' findings on this issue. Regarding these mixed findings, further research is warranted to identify the critical aspects of family relationships in youth smoking and provide valuable information for designing successful parent-child interventions.

Gender has also considered an important factor influencing children's smoking and delinquent behaviors, but despite the relative well-established associations between family factors and adolescent smoking, the unique influence of mothers and fathers on girls' and boys' substance use has received relatively limited attention. Studies have shown that mothers have more open and comfortable relationships with both daughters and sons (Rosnati, Iafrate, & Scabini, 2007; Ackard, Neumark-Sztainer, Story, & Perry, 2006) and spend more time with their children, especially in the early developmental stages; thus mothers who exhibit poor parenting skills affect more negatively their children compared to fathers (Ohannessian et al., 2004). Researchers suggest that negative relationship with primary caregiver can lead to later psychological and interpersonal problems. For example, children of these mothers may experience low self-esteem, stress, and anxiety, and try to reduce these negative feelings through smoking and substance use. In another study, Luk, Farhat, Iannotti, and Simons-Morton (2010) found that parent communication with adolescent substance use would vary with respect to substance and gender and further research should be carried out to understand gender-specific differences with reference to adolescent substance use.

This study aimed to examine: 1) the extent to which mother-child and father-child relationships could predict smoking status among college students; 2) the extent to which mother-child and father-child relationships could predict smoking intensity among college students; and 3) the extent to which mother-child and father-child re-

lationships could predict girls' and boys' smoking status. This research addressed the gap in prior research by investigating the unique role of mother-child and father-child relationships in the smoking behavior of male and female college students. It was hypothesized that mother-child and father-child relationships can predict smoking behavior, and that mother-child relationship is the stronger predictor of smoking. It was also anticipated that mother-child and father-child relationships can predict smoking intensity among college students.

2. Methods

The present research was a cross-sectional study. The sample consisted of 241 Iranian college students who were selected using snowball sampling method among all the graduate and undergraduate students of the Guilan University in academic year 2014-15. Students were asked about their smoking habits. Students who reported irregular or intermittent smoking were excluded from the study, while others grouped into two different categories: smokers (n=142: 50 females and 92 males) and nonsmokers (n=99: 51 females and 48 males); and low (n=62), moderate (n=40), and high (n=40) nicotine dependents (according to Fagerstrom Test for Nicotine Dependence). The sample size was determined using Tabachnick and Fidell (2013) formula. The participants were between 18 to 29 years old (smokers: 23.28±3.92 y; nonsmokers: 21.04±1.96 y), and had no significant difference according to their dwelling status (P=0.83), marriage status (P=0.162), education (P=0.128), and income (P=0.53). Students who reported drug abuse were excluded from the study. Sample's demographic data were collected investigating gender, age, educational level, income, employment status, marriage status, and dwelling status.

Fagerstrom Test for Nicotine Dependence (FTND) is the modified version of the Fagerstrom Tolerance Questionnaire (FTQ), consisting of 6 items designed to assess nicotine dependence intensity (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). Item scoring is based on procedures developed by Heatherton, Kozlowski, Frecker and Fagerstrom (1991) and items are summed to yield a total score (possible range=0-10). Based on their scores, respondents are divided into 3 groups: low-dependence on nicotine, moderate-dependence on nicotine, and high-dependence on nicotine. This scale showed good psychometric properties in Iranian (81% to 83%) (Azizie, Mirzaei, & Shams, 2010) and non-Iranian samples (Meneses-Gaya, Zuardi, Loureiro & Crippa, 2009). FTND demonstrated good internal consistency in the present sample (71%).

Parent-Child Relationship Survey (PCRS) is an instrument designed to measure adults' perceptions of their parent-child relationship. PCRS comes in two forms, one for assessing the mother-child relationship (24-item), and one for assessing father-child relationship (24-item); both forms are identical. PCRS is scored in a 7-point scale from 1 (not at all) to 7 (so much) by reverse-scoring negatively worded items (9, 13, 14), and then summing individual item scores and dividing by the number of items. PCRS has shown excellent validity and internal consistency, with good α values for the father (89% to 94%, with overall α of 96%) and mother (61% to 94%, with the overall α of 94%) subscales (Fine, Moreland, & Schwebel, 1983). Research has shown PCRS's excellent validity and reliability (92% to 93%) in Iranian samples (Parhizgar, 2002; Dadash, 2004). This scale showed excellent internal consistency in this study (93% for both mother and father forms).

Students at the university campus were asked to participate in a research project. For this aim, they were asked about their smoking status. Students who reported no smoking grouped as nonsmokers, while students who reported regular or established smoking habit grouped as smokers. After giving a brief summary of the research project, taking their consents, and ensuring the anonymity of the questionnaires, students were asked to answer the questionnaires. At the end, students were thanked for their cooperation. Participants received no cash bonus.

All the statistical analyses were performed using SPSS-20. Since the dependent variables were dichotomous, three binary logistic regressions and one multinomial logistic regression were conducted to analyze the predictability of smoking status and smoking intensity. As the study aimed to investigate the gender-specific variations in smoking behavior, separate analyses were conducted for females and males.

3. Results

First, the obtained data were checked for multicollinearity and outliers as the primary assumptions of logistic regression (Pallant, 2013). The results of correlation coefficient test and the values of tolerance and VIF in male (r=0.43; Tolerance: 0.81; VIF: 1.23), female (r=0.54; Tolerance: 0.71; VIF: 1.41), and smoker and non-smoker (r=0.49; Tolerance: 0.76; VIF: 1.32) groups showed no multicollinearity. After confirming these core assumptions, binary and multinomial logistic regression were used to examine the predictability of smoking using the predictors. The mean and standard deviation of mother-child and father-child relationships in groups are presented in Table 1.

Table 1. Means and standard deviations of mother-child and father-child relationships

Group	Variable	Mean	SD
Non-smokers	Mother-Child	5.48	0.954
	Father-Child	4.71	1.17
Smokers	Mother-Child	5.04	1.14
	Father-Child	4.45	1.15
Female smokers	Mother-Child	4.92	1.48
	Father-Child	4.39	1.40
Female non-smokers	Mother-Child	5.52	1.14
	Father-Child	4.84	1.23
Male smokers	Mother-Child	5.10	0.897
	Father-Child	4.48	0.996
Male non-smokers	Mother-Child	5.44	0.714
	Father-Child	4.57	1.10
Low	Mother-Child	5.10	1.16
	Father-Child	4.59	1.08
Moderate	Mother-Child	4.72	1.07
	Father-Child	4.11	1.30
High	Mother-Child	5.36	0.974
	Father-Child	4.13	1.14

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Binary logistic regression was performed to assess the impact of mother-child and father-child relationships on the likelihood that respondents would report smoking. The model contained two independent variables (mother-child and father-child relationship). The full model was statistically significant (χ^2 (2, 241)=10.41, P<0.01), indicating the model was able to distinguish between respondents who reported smoking and respondents who did not report smoking. The model as a whole explained between 4.2% (Cox & Snell R square) and 5.7% (NagelKerke R square) of the variance in smoking status, and correctly classified 61.8% of the cases. As shown in Table 2, mother-child relationship made a statistically significant contribution to the model, and re-

Table 2. Binary logistic regression predicting smoking status

	B	SE	Wald	df	P	Odds Ratio	95.0% CI for Odds Ratio	
							Lower	Upper
Father-Child relationship	-0.031	0.131	0.056	1	0.813	0.97	0.75	1.25
Mother-Child relationship	-0.401	0.152	6.936	1	0.008	0.67	0.50	0.90
Constant	2.618	0.783	11.187	1	0.001	13.71		

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Table 3. Multinomial logistic regression predicting nicotine dependence intensity

Nicotine Dependence Level		B	SE	Wald	df	P	Odds Ratio	95.0% CI for Odds Ratio	
								Lower	Upper
Low	Intercept	1.823	0.840	4.713	1	0.030			
	Father-child	0.095	0.149	0.408	1	0.523	1.100	0.82	1.47
	Mother-child	-0.430	0.167	6.598	1	0.010	0.651	0.47	0.90
Moderate	Intercept	2.485	1.042	5.688	1	0.017			
	Father-child	-0.195	0.206	0.896	1	0.344	0.823	0.55	1.23
	Mother-child	-0.541	0.215	6.320	1	0.012	0.582	0.38	0.89
High	Intercept	-0.485	1.728	0.079	1	0.779			
	Father-child	-0.413	0.250	2.742	1	0.098	0.661	0.41	1.08
	Mother-child	0.053	0.316	0.028	1	0.867	1.055	0.57	1.96

The reference group is nonsmokers.

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corded an odd ratio of 0.67. This indicated that respondents who scored higher mother-child relationship were 0.67 times less likely to report smoking, controlling for all other factors in the model.

Then, multinomial logistic regression was performed to assess the impact of mother-child and father-child relationships on smoking intensity. The model contained two independent variables (mother-child and father-child relationships) and 4 groups (nonsmoker, low, moderate, high). The full model was statistically significant (χ^2 (6, 241)=18.82, P<0.01), indicating the ability of the model to distinguish between respondents who reported different levels of smoking intensity. The model as a whole explained between 7.5% (Cox & Snell R square) and 8.3% (NagelKerke R square) of the variance in smoking intensity, and correctly classified 49.4% of the cases. As shown in Table 3, mother-child relationship could significantly distinguish nonsmokers from people with low dependence on nicotine, and recorded an odds ratio of 0.65, which indicated that each increase in mother-child relationship score decrease the likelihood of being in low nicotine dependent group by a factor of 0.65, controlling for all other factors in the model. Father-child relationship did not contribute significantly to the model. In addition, mother-child relationship could significantly distinguish nonsmokers from people with moderate dependence on nicotine, and recorded an odds ratio of 0.58, which indicated that each increase in mother-child relationship score decrease the likelihood of being in moderate nicotine dependent group by a factor of 0.58, controlling for all other factors in the model. Father-child relationship did not contribute significantly to the model. Finally, none of the predictors were able to distinguish nonsmokers from people with high dependence on nicotine.

Binary logistic regression was performed to assess the impact of mother-child and father-child relationships on the likelihood that female respondents would report smoking. The model contained two independent variables (mother-child and father-child relationships). The full model was not statistically significant (χ^2 (2, 101)=5.60, P>0.05), indicating that the model as a whole was not able to distinguish between females who reported smoking and those who did not. The model as a whole explained between 5.4% (Cox & Snell R square) and 7.2%

Table 4. Binary logistic regression predicting smoking status in female students

	B	SE	Wald	df	P	Odds Ratio	95.0% CI for Odds Ratio	
							Lower	Upper
Father-child relationship	-0.111	0.182	0.370	1	0.543	0.895	0.63	1.279
Mother-child relationship	-0.298	0.186	2.569	1	0.109	0.743	0.52	1.069
Constant	2.055	0.956	4.623	1	0.032	7.805		

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Table 5. Binary logistic regression predicting smoking status in male students

	B	SE	Wald	df	P	Odds Ratio	95.0% CI for Odds Ratio	
							Lower	Upper
Father-child relationship	0.091	0.192	0.242	1	0.636	1.09	0.751	1.597
Mother-child relationship	-0.556	0.253	4.837	1	0.028	0.57	0.350	0.941
Constant	3.171	1.303	5.920	1	0.015	23.823		

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(NagelKerke R square) of the variance in smoking status, and correctly classified 58.4% of the cases. As shown in Table 4, neither mother-child nor father-child relationship made a statistically significant contribution to the model.

Finally, binary logistic regression was performed to assess the impact of mother-child and father-child relationships on the likelihood that male respondents would report smoking. The model contained two independent variables (mother-child and father-child relationships). The full model as a whole was statistically significant (χ^2 (2, 140)=7.45, P<0.05), indicating that the model was able to distinguish between males who reported smoking and males who did not report smoking. The model as a whole explained between 3.8% (Cox & Snell R square) and 5.3% (NagelKerke R square) of the variance in smoking status, and correctly classified 65.0% of the cases. As shown in Table 5, mother-child relationship made a statistically significant contribution to the model, and recorded an odd ratio of 0.57. This indicated that male respondents who reported higher mother-child relationship were 0.57 times less likely to report smoking while controlling for all other factors in the model.

4. Discussion

The present study is among the rare systematic investigations of gender-specific variations regarding the association between parent-child relationships and smoking behavior in college students. This paper addresses the gap in research by investigating how mothers and fathers may play different roles in the association between parent-child relationship and their children's smoking behavior. In addition, the present research extends previous investigation by examining mothers' and fathers' role in nicotine dependence intensity as well.

The current study found inconsistent support for its first hypothesis. According to the findings, mother-child relationship, but not father-child relationship, was the significant predictor of smoking status. This finding is in part consistent with the findings of Luk et al. (2010). This study also found mixed support for the second hypothesis that mother-child and father-child relationships can predict smoking intensity in college students. According to the findings, mother-child relationship was the significant predictor of low and moderate dependence on nicotine, while it could not predict high nicotine dependence. On the other hand, father-child relationship could not predict smoking intensity. Finally, the study found inconsistent support for its third and fourth hypotheses that mother-child and father-child relationships can predict smoking status in both female and male college students. While, mother-child relationship was the significant predictor of males' smoking, it could not predict females' smoking. On the other hand, father-child relationship could not predict neither females' nor males' smoking. This finding is in part consistent with the findings of Luk et al. (2010), who reported that mother-child easy communication was negatively associated with smoking among sons. They also found that neither mother-child nor father-child easy communication was associated with smoking among girls.

As mentioned earlier, father-child relationship was not the significant predictor of smoking and smoking intensity. In addition, mother-child relationship could only explain small to moderate amount of variance for smoking behavior in college students. There are several explanations for these findings. First, smoking, as a multifaceted behavior, is influenced by different factors, such as peer pressure, social factors, risk-taking behavior, advertising and media influence, and psychological factors (Morgenstern, Sargent, Engels, Florek, & Hanewinkel, 2013; Jung & Chung, 2013; Bertholet, Faouzi, Studer, Daeppen, & Gmel, 2013; Scherrer et al., 2012; Kristjansson et al., 2010; Kristjansson et al., 2009; Naing et al., 2004; Tyas & Pederson, 1998; Sarason, Mankowski, Peterson, & Dinh, 1992). Thus, in order to understand smoking behavior, all these factors and their interrelations and implications have to be considered.

Second, these results may represent the sample's characteristics. In their college years, youths become increas-

ingly more independent and spend less time with their parents and more time with their peers; so peers and friends may play more important role in youths' lives and decision-makings. In line with this claim, a growing body of research has emphasized on peers' role in youth substance use (Kristjansson, Sigfusdottir, & Allegrante, 2013; Rostila, Almquist, Ostberg, Edling, & Rydgren, 2013; Fuemmeler et al., 2013; Horner et al., 2011; Stanton et al., 2009; Warren, Joens, Eriksen, & Asma, 2006).

The finding that mother-child relationship can only predict low to moderate levels of nicotine intensity implies several possibilities. First, this finding can be indicative of a major difference between the initiating, aggravating, and perpetuating factors of smoking. In other words, mother-child relationship may drive someone to smoke, but it cannot determine later nicotine dependence intensity; instead, as Daw et al. (2013) and Hughes (1986) suggested, smoking intensity may be influenced by factors such as genetic predisposition. In line with this statement, Belsky et al. (2013) suggested that genetic risk score was unrelated to smoking initiation; rather it was associated with an increased likelihood of converting to daily smoker, heavier nicotine dependence, more frequent smoking, more reliance on smoking to cope with stress, and more failure in cessation attempts. Second, studies have shown that smokers have higher chances of falling into depression and anxiety disorders. According to Boden, Fergusson, and Horwood (2010), there is a reciprocal relationship between smoking and depression in which smoking increases the risk of symptoms of depression; depression and anxiety may in turn perpetuate smoking behavior. Thus, it seems plausible that students' nicotine dependence intensity, especially in heavier level, be influenced by some other factors.

This study did not find any support for the role of mother-child and father-child relationships in females' smoking behavior. According to Luk et al. (2010), one possible explanation for this finding relates to parents' different communication content towards sons and daughters. They believe that parents are more likely to underestimate the prevalence of risk behaviors among daughters than sons; so, they may spend more time talking to their sons about the negative outcomes of smoking. In addition, it is possible that girls have completely different reasons for initiating smoking. More research is needed to clear our understanding about the correlates of smoking in females.

The present study supported the role of mother-child relationship in smoking behavior and smoking intensity, but the amount of variance explained by these predictors was relatively small. However, based on Allen, Donohue, Griffin, Ryan and Turner (2003) findings, other factors may have a greater influence than parents on substance use, but parents do exhibit an influence on this behavior, which cannot be ignored. Youths who report positive mother-child relationship may experience more positive family environment, which can protect them against stressful events and help them manage their problems using more efficient coping strategies. They may also spend more time talking to their mothers, which rises their awareness about the harmful effects of smoking, and protect them against risk factors such as misinformation, media influences, advertising, or social pressures. In sum, further research is needed to clear our understanding of gender-specific correlates of smoking among youth.

The results of this study have important implication for smoking prevention and intervention efforts. According to the findings, improving mother-child relationship may be beneficial in the prevention and intervention program, especially for male youth. It is also advantageous to raise parents' awareness on daughters' smoking behavior and help them to play a more active protective role in their relationships with their daughters. Further research is needed to determine the exact role of parent-child relationship in youth smoking behavior. Future studies can investigate the protective role of parent-child relationship as a mediator and moderator in the relationship of smoking and other risk factors.

The findings of present study should be interpreted cautiously because of two limitations. First, this study had cross-sectional and correlational nature, so casual conclusions cannot be drawn out of it. We suggest that future studies investigate the long-term role of parent-child relationship in youth smoking using longitudinal design. Second, these findings are limited to college students, and any generalization to other populations has to be done cautiously.

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Conflict of Interest

The authors declared no conflicts of interest.

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