Original Article

Psychological and Familial Factors of Depression in Relation to Adolescent Smoking Behavior

Hamidreza Roohafza, Razieh Omidi[1], Tahereh Alinia[2], Kamal Heidari[1], Marziyeh Farshad[3], Hossein Davari[4], Zahra Abtin[1], Ezat Shahriari[4], Mahshid Taslimi[5], Masoumeh Sadeghi[6]

From the Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, [1]Isfahan Province Health Center, [3]Deputy of Prevention, Isfahan Province Welfare Organization, [4]Department of Social Injury Prevention, Isfahan Province Education Organization, [5]Psychosomatic Research Center, [6]Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, [2]Student Research Committee, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Address for correspondence:
Dr. Tahereh Alinia, Student Research Committee, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
E-mail: alinia_t@yahoo.com

Abstract

Background: Several common factors have been identified for smoking and depression. The The present study explores the relation of psychological and familial factors with depression, by student smoking behavior. **Materials and Methods:** A total of 5500 middle- and high-school students were selected in Isfahan province in 2010. A self-administered questionnaire collected data on background characteristics, smoking status, depression, and risk factors. Univariate analysis multiple logistic regressions were conducted to compare between depressed and nondepressed people by adolescent smoking status. Odds ratios and the corresponding 95% confidence intervals (CIs) were reported. **Results:** Fathers lower education attainment was accompanied adolescents higher depression prevalence. Parental smoking and sibling smoking increased the depression likelihood by 1.41 (95% CI: 1.18, 1.68) and 1.43 folds (95% CI: 1.04–1.94) for never-smokers. Positive attitude toward smoking increased the probability of depression by 1.18 among never-smokers. Never-smokers lacking refusal skill had 1.23 (1.03–1.47) higher chance of depression. A higher level of self-efficacy related to lower chance of depression. Taking risky behavior, increased the depression likelihood by 1.56 (95% CI: 1.29–1.89) in never-smokers, by 1.85 (95% CI: 1.37–2.44) in experimental smokers, and by 1.14 times (95% CI: 1.01–1.72) in current smokers. Family conflict increased depression chance by 2.25 times (95% CI: 1.89–2.66) in never-smokers, by 1.95 (95% CI: 1.46–2.61) in experimental smokers, and by 2.06 times (95% CI: 1.38–3.08) in current smokers. **Conclusions:** Targeting self-efficacy level, risky behavior, and family conflict can drop the comorbidity of smoking and depression simultaneously. This may help public health practitioners and policymakers to develop common strategies in reducing adolescents smoking and depression comorbidity.

Keywords: *Adolescent, depression, familial factors, psychological, smoking*

Introduction

Adolescent depression is often multifactorial matters that raise the risk of undesirable behaviors and outcomes. Adolescents may act in some rebellious and unhealthy behaviors or attitudes in an attempt to cope with their depression, including alcohol or drug abuse, dangerous or risky behaviors, such as reckless driving, out-of-control drinking, and unsafe sex.[1] In addition, the link of depression with smoking has been extensively recognized which in turn result in health hazards[2] and carry over smoking later in life.[3]

Comorbidity of depression and smoking is well documented. Two discriminated routes are postulated for the comorbidity; the first involving a direct path in which smoking increases the risk of depression and the second is the common or correlated risk factors named common etiology theorem (CET).[4]

From the direct causal point of view, the lifetime prevalence of depression predicts smoking onset.[1] It may cause smoking by increasing the likelihood that individuals will self-medicate negative feelings with nicotine.[5,6] Alternatively, smoking was found to increase the risk of developing an episode of depression.[1] The mechanism which accounts for this association is via alterations in neurotransmitter pathways following chronic exposure.[7]

CET has become a topic of growing interest. This concept has made bold claims about the comorbidity between depression and smoking explained by the risk factors associated with both outcomes.[8] Some aspects of genetic and environmental

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factors have been previously discussed.[9] Emerging evidence from genetic epidemiology has shed light on the possible mechanisms underlying this form of comorbidity by examining the patterns of familial aggregation.[1,10] Environmental factors were considered involving common exposure to prenatal environmental factors such as maternal smoking or disruptive family atmosphere.[9]

Several risk factors were associated with both smoking and depression.[8] Familial factors, including family conflict, bonding, and parental education have often been found to be related to smoking.[11] Young people are more likely to use tobacco if they perceive the tobacco use to be acceptable or normative in their family.[12] Family conflict raises the adolescent smoking.[13] Family bonding and parental support are protective factors against adolescents smoking intention.[13] Psychological factors may influence smoking initiation.[11] Positive attitudes toward smoking, raise smoking initiation likelihood.[14] Self-efficacy is protective against smoking initiation.[15] Current smokers have a higher likelihood of deviance or risky behaviors.[16,17] Current smokers are more likely to use marijuana or hard drugs and sell drugs. A longitudinal study revealed that these adolescents are at higher risk for dropping out of school, low academic achievement and behavioral problems at school, stealing, and other delinquent behaviors.[16] Smoking has also been associated with higher suicide risk,[18] alcohol and drug use,[19] intimate partner violence, and sexual attitudes.[20] Studies have shown that parental support decreases the risk of depression onset.[21] A significantly higher percentage of youths who reported using substances reported depressive symptoms as compared with other youths. Youths who were frequently involved in bullying, either as perpetrators or as victims, were more than twice as likely as to report depressive symptoms.[22] Low levels of self-efficacy generally were accompanied by high levels of depressive symptoms. Depression can trigger and intensify feelings of ugliness, shame, failure, and unworthiness.

Although much is known about the genetic and environmental component of CET; however, studies on psychological and familial factors is lacking. Support for novel covariate may have far-reaching implications for both treatment and prevention strategies. This study employs Isfahan Tobacco Use Prevention program data to investigate the co-occurrence of depression and smoking in relation to psychological and familial factors in three groups of students with different smoking status including never-smokers, experimental, and current smokers.

Materials and Methods

Study design and participants

The target population for this study was 5500 students in grade 6–12 in Isfahan Province from September to October 2010. They were selected through a multistage random cluster-sampling scheme. Educational districts were considered as clusters. Stratified sampling was taken based on the school level (high/middle school), gender, and area of residence (rural or urban area) within each cluster. Afterward, schools were selected randomly from among each cluster. Ultimately, students were taken from among selected schools using a random numbers table. Students filled consent form of participation and answered the questionnaires in a 30 min period during class time. Trained staff gave help to students completing the questionnaires. A total of 5408 questionnaires were completed and returned equivalent to 98.3% response rate. The study was approved by the ethical committee of Isfahan University of Medical Science.

Variable assessment

Smoking status

It was classified into five subgroups including (1) never used and never tried smoking, (2) smoked at least one puff or more, (3) smoked at least once a month but less than once a week, (4) smoked at least once a week but less than once a day, and (5) smoked at least once a day. Grouping has been made and considered the first strata as never-smoker, 2 and 3 as an experimental smoker, and 4 and 5 as a current smoker.

Shared risk factors

A self-administered anonymous questionnaire collected data on background information including age, sex, parent education attainment years (0–5, 6–12, >12 years), and shared risk factors, including the extent of owning smoker fiends (low, medium, and high), parent and sibling smoking (yes, no), parental advice, favorable attitude toward smoking, susceptibility to future smoking, refusal skill, self-efficacy, family conflict, and risky behaviors. Age has been represented as a continuous variable.

Parental advisory

Parent has great potential for influencing the behavioral development of their adolescents. A question was asked about how often does parent advice on the risks and the adverse effect of smoking. The answer categorized as options were rare, occasional, and very frequently.

Attitude toward smoking

It was assessed via nine items, using a two-point response (agree, disagree). The score ranged from 0 to 9. The higher the score, the more positive attitude student has. The score dichotomized by median and the score below 5 considered as a negative attitude about smoking and score equal or above 5 as positive attitude on smoking using a median split of 5.

Susceptibility to future smoking

We assessed the adolescents' intention of future smoking. Students answered the question, "Is there a possibility that

you will smoke or maintain smoking in the future?" With yes/no choices. Those with a yes response were susceptible to future smoking.

Refusal skill

It was measured by asking, "Could you say no to a friend who offers you smoke a cigarette or water pipe?" The response was yes or no.

Self-efficacy

It was explored by asking 10 questions of The General Self-Efficacy Scale[23] with responses rating from 0 = not at all to 3 = exactly true. The range of scores was 0–30. A higher score indicates higher levels of self-efficacy. It then categorized into three levels <15, 15–25, and >25 that respectively named as low, moderate, and high, respectively. The Cronbach's alpha was 0.90.

Risky behaviors

A researcher invented questionnaire measured risky behavior using a 3-item scale ranges 0–15 points, (1) it's worth to get into trouble for fun, (2) I like risk-taking (3) I enjoy doing things that people believe should not be done. Item scored on a 5-point Likert scale from 1 = not at all to 5 = always. A higher score indicates higher risk behaviors. The score categorized into two strata by the median score. The Cronbach's alpha was 0.87.

Family conflict was the sum of three item scale scores invented by the author: (1) My parents nag me for any excuse, (2) my family does not understand me, and (3) I have a lot of argument with my family. The students answered each item, yes or no which scored 1 and 0, respectively. The scale ranged from 0 to 3. A high score shows higher family conflict. Then, score dichotomized by a median. The Cronbach's alpha was 0.85.

Depression

The participants completed a 13-items depression subscale of the SCL-90 questionnaire, by rating items on how they have felt in the past 4 weeks. The possible total score (Cronbach's alpha of 0.80) ranged from 0 to 13; the higher the score, the more depressed the person was. The score then stratified in two categories by median score. Students above the mean considered depressed and those below the median as nondepressed.

Statistical analysis

Qualitative variables were presented as mean (one standard deviation) while qualitative variables were presented as absolute and percent relative frequencies. Data were splinted by smoking stages. Univariate analysis was conducted to compare between depressed and nondepressed people within any stages. Differences between groups were analyzed by *t*-test or Chi-square test using SPSS version 15 (SPSS Inc., Chicago, IL, USA) software. Multiple logistic regressions adjusted the data for the effect of background variable and every other variable. All reported statistical tests are two-sided, and $P < 0.05$ considered statistically significant; odds ratios (ORs) are reported with the corresponding 95% confidence intervals (CIs).

Results

Table 1 compares demographic, familial and psychological factors between depressed and not-depressed students by three different groups by their smoking status. The statistically significant age difference is not numerically meaningful between depressed and not-depressed student at any stage of smoking. Never-smoked girls and boys less frequently experience depression. 48.3% of experienced girls and 22.3% of smoker girls are depressed. A lower education attainment year of fathers was accompanied higher percentages of depression. Among smoker student, (149) 41.4% with mothers with <5 years of education attainment, (141) 39.2% with mothers with 6–12 years of education, and (70) 19.4% with mothers with more than 12 years of education ($P = 0.04$) were depressed. 32.2% of never-smokers owning smoker parent were depressed in compression to the 24.8% whom not-depressed. 9.4% versus 5.3% of never-smokers, 20.4% versus 13.2% of experienced owning smoker sibling were depressed. Data indicated a lower level of parental advisory for depressed never-smokers and experimental smokers. Positive attitude toward smoking was more prevalent among of depressed (41%) than not-depressed (37%) among never-smoker. The figure was 79% versus 64.8% among current smokers. Never-smoked and susceptible to future smoking (7.1%) were depressed, and 3.9% were not depressed. Self-efficacy, risky behaviors and family conflict were important factors for depression in any stage of smoking. Lower self-efficacy was more prevalent among depressed adolescents.

Table 2 exhibits multiple logistic regression of relation between demographic, familial, psychological factors and depression by three different stages of smoking. Data demonstrated that parent smoking increased the depression likelihood by 1.41 folds (95% CI: 1.18, 1.68) among never-smokers. Sibling smoking also raised the depression odds (OR: 1.43; 95% CI: 1.04–1.94) for never-smokers. Positive attitude toward smoking increased the probability of depression by 1.18 times among never-smokers. Never-smokers lacking refusal skill had 1.23 (1.03–1.47) times higher chance of depression. A higher level of self-efficacy related to lower chance of depression. Taking risky behavior, increased the depression likelihood by 1.56 times (95% CI: 1.29–1.89) in never-smokers, by 1.85 (95% CI: 1.37–2.44) in experimental smokers and by 1.14 times (95% CI: 1.01–1.72) in current smokers. Having a conflict between family increased depression chance by 2.25 times (95% CI: 1.89–2.66) in never-smokers, by 1.95 (95% CI: 1.46–2.61) in experimental smokers and by 2.06 times (95% CI: 1.38–3.08) in current smokers.

Table 1: Univariate analysis of the association between demographic, familial and psychological factors, and depression by three different stages of smoking

Variables	Never-smoker			Experimental smoker			Current smoker		
	Depressed	Not depressed	*P*	Depressed	Not depressed	*P*	Depressed	Not depressed	*P*
Age year (mean±SD)	14.28±1.72	14.04±1.72	0.001	14.79±1.56	14.70±1.51	0.37	14.82±1.64	15.09±1.43	0.04
Sex									
Boy	492 (35.2)	846 (43.5)	0.001	305 (51.7)	353 (68.0)	0.001	292 (77.7)	257 (86.5)	0.003
Girl	904 (46.8)	1098 (56.5)		285 (48.3)	166 (32.0)		84 (22.3)	40 (13.5)	
Father education (years)									
0-5	545 (42.0)	673 (35.7)	0.02	207 (36.4)	184 (36.7)	0.53	126 (36.0)	109 (39.1)	0.34
6-12	544 (40.1)	790 (41.9)		223 (39.2)	209 (41.6)		142 (40.6)	118 (42.3)	
>12	267 (19.7)	423 (22.4)		139 (24.4)	109 (21.7)		82 (23.4)	52 (18.6)	
Mother education (years)									
0-5	661 (48.7)	849 (44.9)	0.10	272 (48.0)	237 (47.3)	0.70	149 (41.4)	138 (49.5)	0.04
6-12	495 (36.5)	735 (38.9)		203 (35.8)	190 (37.9)		141 (39.2)	105 (37.6)	
>12	200 (14.7)	305 (16.1)		92 (16.2)	74 (14.8)		70 (19.4)	36 (12.9)	
Friend smoking									
Low	1336 (96.0)	1883 (97.1)	0.15	531 (90.6)	471 (90.9)	0.92	221 (58.9)	188 (63.3)	0.43
Medium	30 (2.2)	26 (1.3)		30 (5.1)	24 (4.6)		47 (12.5)	37 (12.5)	
High	26 (1.9)	30 (1.5)		25 (4.3)	23 (4.4)		107 (28.5)	72 (24.2)	
Parental smoking	447 (32.2)	482 (24.8)	0.001	239 (40.6)	214 (41.3)	0.80	184 (49.1)	131 (44.3)	0.24
Sibling smoking	131 (9.4)	103 (5.3)	0.001	119 (20.4)	68 (13.2)	0.002	100 (26.7)	73 (24.7)	0.59
Parental advisory									
Very frequently	1079 (77.6)	1608 (83.1)	0.001	415 (70.5)	405 (78.5)	0.01	275 (73.3)	219 (73.7)	0.56
Occasionally	144 (10.4)	164 (8.5)		83 (14.1)	53 (10.3)		37 (9.9)	35 (11.8)	
Rarely	167 (12.0)	162 (8.4)		91 (15.4)	58 (11.2)		63 (16.8)	43 (14.5)	
Positive attitude toward smoking	561 (41.0)	701 (37.0)	0.02	285 (49.4)	223 (44.2)	0.08	286 (79.0)	186 (64.8)	0.001
Susceptibility to future smoking	98 (7.1)	75 (3.9)	0.001	172 (29.3)	135 (26.3)	0.28	243 (65.1)	193 (65.6)	0.93
Lack of refusal skill	478 (34.4)	605 (31.4)	0.07	183 (31.1)	162 (31.4)	0.97	163 (43.4)	132 (44.6)	0.75
Self-efficacy									
Low	378 (28.5)	417 (23.0)	0.001	206 (36.9)	110 (23.0)	0.001	147 (41.5)	89 (33.0)	0.03
Medium	717 (54.0)	908 (50.1)		281 (50.4)	269 (56.2)		158 (44.6)	126 (46.7)	
High	232 (17.5)	487 (26.9)		71 (12.7)	100 (20.9)		49 (13.8)	55 (20.4)	
Risky behaviors	440 (32.0)	370 (19.4)	0.001	300 (51.9)	174 (34.5)	0.001	248 (67.0)	171 (59.4)	0.02
Family conflict	1375 (71.1)	680 (49.2)	0.001	316 (61.7)	237 (40.4)	0.001	134 (45.4)	99 (26.8)	0.001

SD: Standard deviation

Discussion

This study has a valuable finding in consistency with the formulated hypothesis of the CET theory on investigating the comorbidity of smoking and depression. The finding is unique in that provide new insight on the component of CET theory other than environmental and genetic factors. Positive attitude toward smoking was found to be significantly associated with depression among current smokers; parent or sibling smoking and lack of refusal skill were also related to depression among never-smokers. A factor has expected to be a modifier in the link between smoking and depressiveness if there would the different strength of association between modifying factor and depression for different stages of smoking. Psychological factors, including self-efficacy level, risky behavior commitment, and conflict in the family, were related to depression in every stage of smoking status.

This study detected small but statistically significant difference mean age by smoking status, which it may be a result of a large study sample size which empowers study in detecting small differences. Parent education level was inversely correlated with student's depression. Among smokers, parent and sibling smoking was not different among depressed and non-depressed students. However, individuals in lower stages of smoking status were under the influence of parent and sibling smoking to develop depression. This indicates the fact that smoking and depression behaviors are heavily influenced by factors in the immediate environment, including family, peers, and school.

Table 2: Multiple logistic regression of relation between demographic, familial, psychological factors, and depression by three different stages of smoking

	Odds ratios and 95% confidence intervals*		
Variables	Never-smoker	Experimental smoker	Current smoker
Friend smoking			
Low	Reference	Reference	Reference
Medium	1.33 (0.39, 1.42)	1.07 (0.47, 1.86)	1.07 (0.54, 1.77)
High	1.20 (0.43, 1.61)	1.04 (0.78, 1.93)	1.15 (0.52, 1.32)
Parental smoking	1.41 (1.18, 1.68)	0.95 (0.71, 1.27)	1.29 (0.89, 1.89)
Sibling smoking	1.43 (1.04, 1.94)	1.42 (0.96, 2.09)	1.31 (0.83, 2.07)
Parent advice			
Very frequently	Reference	Reference	Reference
Occasionally	0.88 (0.67, 1.16)	0.73 (0.47, 1.12)	1.08 (0.62, 1.89)
Rarely	0.92 (0.69, 1.21)	0.75 (0.48, 1.17)	1.14 (0.61, 2.15)
Positive attitude toward smoking	1.08 (0.91, 1.29)	0.96 (0.71, 1.29)	2.04 (1.32, 3.15)
Susceptibility to future smoking	1.29 (0.90, 1.85)	0.94 (0.68, 1.31)	0.87 (0.53, 1.26)
Lack of refusal skill	1.23 (1.03, 1.47)	0.92 (0.79, 1.50)	0.82 (0.55, 1.22)
Self-efficacy			
Low	Reference	Reference	Reference
Medium	0.93 (0.77, 1.13)	0.66 (0.47, 0.90)	0.97 (0.68, 1.57)
High	0.74 (0.58, 0.94)	0.50 (0.33, 0.78)	0.60 (0.34, 0.74)
Risky behaviors	1.56 (1.29, 1.89)	1.85 (1.37, 2.44)	1.14 (1.01, 1.72)
Family conflict	2.25 (1.89, 2.66)	1.95 (1.46, 2.61)	2.06 (1.38, 3.08)

*Adjusted based on age, sex, and father and mother education

The findings show a higher likelihood of depression for smoker students with positive attitudes toward smoking. Previous researches have shown that the anti-smoking attitudes have relation with decreased likelihood of smoking.[24] From other hand, individual positive smoking attitudes determine smoking adaptation among adolescents.[14] Positive attitudes about the acceptability, attractiveness, and availability of smoking, raise the likelihood of smoking.[25,26] Positive attitudes regarding positive expectations on the consequences of smoking, such as coping with stress and controlling weight make the youths susceptible to future smoking. According to the attitude, such as willingness to smoke may be likely justification for the path from depression to smoking.

Refusal skill was the protector of depression among never-smokers. Refusal skills have a suppressive effect on the onset of use by enabling nonusing adolescents to refuse offers of cigarettes and smokeless tobacco.[27] Therefore, the ability to refuse smoking is related to nonsmoking in youths. This may be a possible excuse for detecting the protective effect of refusal skill on depression.

This study detected a meaningful effect of lower self-efficacy on the higher possibility of depression with different strength among nonsmokers, experienced, and current smoker. Bandura *et al*.[28] found the relation of social self-efficacy to depressive symptomatology. McFarlane *et al*.[29] found that social self-efficacy and social support from family and peers are interrelated in their links with depression. In addition, self-efficacy has been postulated to protect against smoking initiation.[15] A study in Turkey showed that higher self-efficacy levels accompany higher negative perceptions on smoking disadvantages.[30] Therefore, self-efficacy could be a common causative factor for smoking and depression, which prove CET for the association between smoking and depression. The findings of this study are in agreement with a number of studies that have suggested a comorbidity pathway from smoking to depression.[4] The justification could be that self-efficacy is related to positive emotions and thinking patterns and may help the students in good adaptation hence the lower level of depression and meanwhile healthier lifestyle such as avoiding smoking.

There are a lot of risky behaviors both within and around adolescents which raise the smoking probability.[31] Smokers have a higher likelihood of deviance or risky behaviors.[16,17] A longitudinal study revealed that smoker youths are at higher risk for dropping out of school, low academic achievement and behavioral problems at school, stealing, and other delinquent behaviors.[16] Smoking has also been associated with higher suicide risk,[18] alcohol and drug use,[19] intimate partner violence, and sexual attitudes.[20] This study suggests that risky behavior is linked with depression in either stage of smoking status.

Family conflict accompanies increase the chance of depression. Students with family conflict were more likely to initiate smoking behavior. Strong family bonds and parent support decrease the risk smoking contemplation.[32] Conflicts between parents and teens are more likely during adolescence. Conflicts can result as teens pull away from their parents and spend more time with friends, which in

turn increases the risk of peer behavior imitation.[33] On the basis of the self-efficacy, risky behavior and family conflict associations with depression in the present sample and previous research finding which showed the association of the mentioned factors with smoking, the results support the CET, which is consistent with previous researches.[4,34]

The findings presented in this paper should be considered in light of the following limitation. The data used to test this model were cross-sectional; to establish causalty, longitudinal data would be necessary.

Conclusion

The implications of findings for interventions are significant in the following way. This study is unique in investigating new dimensions for CET, i.e., psychological, familial factors of comorbidity of depression, and smoking and gaining new insights. Findings support the theory of CET for self-efficacy level, risky behavior, and family conflict. Targeting on these variables can drop the comorbidity of smoking behavior and depression simultaneously; however, interventions on other explored variable may have a different impact on different smoking status groups. This may help public health practitioners and policymakers to develop common strategies in reducing levels, both smoking and depression occurrences among adolescents.

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Conflicts of interest

There are no conflicts of interest.

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