

## Central Lancashire Online Knowledge (CLoK)

Title	Effects of Family-Related Activities on Adolescent Smoking in the United States: Evidence from a Longitudinal Study
Type	Article
URL	<a href="https://clock.uclan.ac.uk/id/eprint/40540/">https://clock.uclan.ac.uk/id/eprint/40540/</a>
DOI	10.22038/IJP.2022.62855.4802
Date	2022
Citation	Dana, Amir, Christodoulides, Efstathios, Baniyadi, Tayebbeh and Ghorbani, Saeed (2022) Effects of Family-Related Activities on Adolescent Smoking in the United States: Evidence from a Longitudinal Study. International Journal of Pediatrics, 10 (3). pp. 15535-15546. ISSN 1687-9740
Creators	Dana, Amir, Christodoulides, Efstathios, Baniyadi, Tayebbeh and Ghorbani, Saeed

It is advisable to refer to the publisher's version if you intend to cite from the work.  
10.22038/IJP.2022.62855.4802

For information about Research at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

# Effects of Family-Related Activities on Adolescent Smoking in the United States: Evidence from a Longitudinal Study

## Abstract

Worldwide, Smoking is one of the most critical public health issues. On the other hand, different levels of family activity may explain adolescent smoking behaviors. Therefore, this longitudinal study examines the effect of family activities on adolescent Smoking in the United States. 4966 American adolescents aged 12-18 years are used for analysis between 1980-2015. Family process criteria (peer influence, control variables, and Smoking) are used to collect data. Kaplan- Meier survival analysis and logistic regression are used to analyze the data. The results showed that women less likely smoke than men. The same is true for blacks compared to white. Children separated from the family are 20 percent more likely to smoke, and adolescents with high physical activity levels are less likely to smoke before age 16. Moreover, moderate sport reduces risk of smoking by 15%, so people who were more physically active were less likely to smoke during adolescence, but parental education was not related to smoking. Developing standard programs with adequate education and social reinforcement and the efforts of families and communities to engage in sports activities reduced adolescent smoking.

**Keywords:** Family activities, Smoking, Adolescents

## 1. Introduction

Worldwide, smoking is one of the most critical public health issues. However, smoking causes the death of 50% of smokers, affecting approximately 7 million people worldwide each year and is a significant public health concern not only for the elderly but also for adults (1). The current smoking patterns showed that the annual number of smoking-related Mortality is expected to reach 10 million by 2030. In the 21st century, there is probably 1 billion smoking-related Mortality that mostly occur in low-income and underdeveloped countries (2). Despite significant efforts in recent decades to combat smoking, this factor is still a major cause of various preventable diseases (3). So that smoking is one of the direct causes of cardiovascular disease, cancer, and respiratory (4). Dwivedi et al. (2013) noted that smoking alone is responsible for most cancer and coronary artery disease cases (5).

Many adolescents are aware of smoking adverse effects on health, but smoking is conducted as a recreation, promoting smoking as a regular matter. Studies have shown that early onset of smoking, even occasionally, can lead to a rapid increase in smoking and regular smoking (6, 7). Smoking is more likely to begin in adolescence, and the prevalence of smoking among adolescents in the United States in 2015 was higher than in previous surveys between 2002 and 2008. Smoking onset occurs during adolescence for various reasons, including low grades, low academic motivation (8), lower life satisfaction (8), and Nicotine dependence as early as 24 months after onset. However, the elapsed time is considered from the onset (9). It is estimated that more than 2,000 adolescents engage in regular smoking each day (9). About 29 percent of adolescents now smoke, while the rate has gradually increased from 24 percent in ninth grade to 35 percent among 12th graders (10). Thus, the development of smoking in adolescence is a significant concern, and identifying the factors that affect progress is very important for smoking prevention and interventions.

On the other hand, smoking is not related to the individual phenomenon, and efforts to control addiction should be focused on the whole family (4). because the family has the most direct and lasting impact not only on education and psycho-intellectual development but also on the formation of values, attitudes, behaviors, and habits of children (3). Sharma et al. (4) stated that the family atmosphere might play a role in nicotine dependence and the rate of smoking in the smokers' family was significantly higher than the control group (5). Wells et al. (11) also found that some family-related factors, family functioning, and parenting are exogenous variables that mediate the risk and protective factors leading to smoking and drinking behavior.

Social learning theory focuses on the importance of family members and peers for young people in modeling substance use behaviors (12). Positive social impact during adolescence is an essential factor in preventing or delaying the onset of smoking. The social effect of stress on the family process and peer behavior is modeled as the main factors influencing the growth of substance use in adolescents (12). Family processes are built by subsystems such as parental supervision, family routines, and parent-adolescent relationships. These subsystems are independent of each other and work interdependently. The family process has a multidimensional structure and plays a decisive role in determining the complexity of daily family life (13). Parenting and a positive family process are less likely to lead to substance use. Effective monitoring is associated with a reduced likelihood of relationships with peers who use drugs. Adolescents with higher interactions and family routines tend to exhibit less risky behaviors (4). Adolescence is a period during which people want more independence, and parental restrictions and restricting adolescents' activities or relationships harm substance use. Less parental regulation is associated with a higher risk of substance use for women and girls (5).

As young people gain more control over their social relationships, socializing with peers who engage in antisocial and illegal behaviors is one of the most critical factors in substance use at an early age (13). Adolescents who exaggerate about Smoking and drinking may be at greater risk for smoking. Smoking is more likely to occur in social situations (4). Frequency of use is associated with lower rates, and people who are not friends of smokers are more likely to prevent smoking.

Contrary to empirical evidence and theoretical frameworks for family bonding and peer influence, and the onset of smoking, there are many gaps in the literature. First, the family process criteria, including the relationship between parental supervision and substance use, have been examined in various studies (4,13). Other criteria of the family process are not sufficiently evaluated. Second, most studies have used general measures of peer influence. However, peer influence has a multidimensional nature that may affect participants in different ways. The purpose of this study is to examine socialization processes. This study examines the variability between peer influence criteria (e.g., peers who smoked, used illicit drugs, belonged to gangs, and drank at least once a month). Third, although previous research has shown a gender difference in smoking (4), other research has shown no gender difference in the onset of smoking (5). Heidari (4) also showed that demographic characteristics of age and level of education had a significant relationship with smoking. Little research has been done on the extent of longitudinal gender differences from early adolescence to age 35. In addition, a delayed relationship is established between the family process and peer influence metrics to measure one-way influences, providing more assertive statements about the long-term impact of socialization on smoking. Also, Mahabee-Gittens et al. (13) examined the effects of family on smoking in different racial groups and showed that family effects had a positive effect on smoking. High levels of family influence also protect against smoking in all racial/ethnic groups.

Previous research has identified several factors associated with adolescent Smoking. One of the behavioral factors that may slow down the process of smoking is physical activity. Studies have shown a negative and coherent relationship between physical activity and Smoking, and show that adolescents who participate in higher levels of physical activity smoke less (14, 15). For example, one study found that increased student participation in sport during high school was associated with a reduced likelihood of regular or intense smoking (16). Efendi et al. (9) showed that Smoking increases the incidence of respiratory symptoms and decreases physical activity in healthy women. Maziar et al. (17) explained the role of sport and physical activity in creating a healthy society emphasizing reducing crime and smoking. The results indicate that sport and physical activity ,directly and indirectly, affect crime, drug use, and smoking reduction. Peretti-Watel et al. (18) showed a negative relationship between sport as an elite student-athlete and smoking and alcohol use. Audrain-McGovern et al. (9) showed that higher levels of physical activity reduce the chances of high levels of Smoking by about 1.5. Inthachai et al. (19) pointed out that healthy people who smoked and did not sport face imbalances in body composition, decreased respiratory muscle strength, sport performance, and increased arterial stiffness. These studies suggest that physical activity may have a protective function against smoking. However, available data on physical activity and Smoking in adolescence are incomplete and primarily cross-sectional (20). Ahmadabadi (21) showed no significant relationship between being an athlete and smoking, alcohol, and drug use. This article is a longitudinal study examining how family process and peers affect the smoking onset from adolescence to adulthood for both men and women. Given these factors, this study has two primary purposes. First, what are the relationship between family process criteria (e.g., parental supervision, family routine, and independence once puberty) and the onset of smoking? Second, what are the relationship between peer influence (e.g., smoking, illicit drugs, drinking, and gang membership) and the onset of Smoking? It is predicted that people with positive family background, fewer peers involved in smoking, alcohol use, and misbehavior are less likely to smoke early.

## **2. Method**

### **2.1 Sample**

The National Longitudinal Study of Youth 1997 (NLSY97), a prospective national representative survey from the 1980-1984 cohort, was used for this study. The first wave began in 1997 when participants were between 12 and 18 years old, and since then, respondents have been interviewed annually. Nlsy97 has collected data on substance use and crime, including detailed information on smoking more than seventeen waves by 2015. In the first wave, a parent or guardian was asked about academic achievement and family structure. 46.33% were male among 4966 eligible adolescents. In the last wave, nearly 20% of men and 16% of women had smoked at least once.

## 2.2 Criteria

**Smoking onset.** All adolescents were surveyed about their smoking experience, referred to as "grass" or "pot" in the questionnaires. In the first wave, respondents were first asked if they had ever smoked. In round 2, respondents who previously answered a valid question about Smoking were asked if they had smoked since the last interview. This was a risk indicator that participants had smoked at least once, and those who reported smoking were eliminated at each wave.

**2.2.1 Family process criteria.** Four family process criteria were examined: family routine, parental supervision, and parent-adolescent relationship. These measures are designed as time-varying variables at maturity. This index had four questions, and the range of each question was from 0 = no day in the week to 7 = all 7 days of the week. Four questions were asked: How many days in a typical week does the respondent eat dinner with the family, help his / her parents with household chores, have fun with them, and do a religious activity as a family? Thus, the potential range was 0 to 28, and higher scores indicated more days of routine family activities. This study coded family routines from 0 to 16 as low family routines and 15 to 28 as moderate to high family routines. The Parental supervision scale was based on four questions: Do parents have information about adolescent friends, parents or friends, educational status, and teachers? The parental supervision scale was the sum of these four scores, from 0 to 16. The degree of parental supervision is coded 0 to 8 as low supervision and 9 to 16 as high supervision. The control/autonomy scale has two sets of questions, including limit Setting and breaking. The limit setting scale includes questions about setting limits for staying awake at night, socializing with friends, and watching TV series or movies. This variable is coded at three levels: (1) Adolescents set all the limits. (2) Parents set all limits, and (3) limits jointly imposed by parents and adolescents. The latest family process in this study is the limit-breaking scale, which asks adolescents how many times they have broken each of these limits in the past 30 days. The variable is coded in two sentences: (1) The adolescent broke the limits, and (2) the child broke the limits.

**2.2.2 Peer influence.** participants answered questions about the percentage of peers involved in different activities in the first wave. They assessed four peer behaviors, including the percentage of peers involved in Smoking, drinking at least once a month, gang membership, Smoking, and illegal drugs. In each question, participants were asked what percentage of peers were involved in negative behaviors. The answers ranged from 1 (almost none) to 5 (almost all) for all questions. These four items are coded in two sentences: (1) high (more than 50% of peers) and (2) low (less than 50% of peers).

**2.2.3 Control variables.** Information about family structure in adolescence was used to control the analysis. Several variables cause parental divorce. First, one parent was asked about all previous marriages and divorces; in the second set of variables, the people whose parents divorced after the first round were identified. In rounds 6, 11, and 13, young people were asked if their parents had been divorced in the last 5 years. This set of variables was used to create a binomial variable to identify an intact family or a divorced family. In addition to gender and race/ethnicity to control the analysis, several other individuals' experiences were used to test family formation factors in this study.

This study was controlled in terms of education level, employment and enrollment status as life events, and maternal education and age at birth of the respondent to control the socio-demographic status of mothers. Academic achievement status was classified into four groups: lower than high school, high

school, associate, and bachelor or higher. A binomial time-varying variable is designed for employment status, identifying those who work part-time and full-time and those who do not. The last time-varying control variable was the enrollment status, which included people enrolled in schools, universities and those who did not.

### 2.3 Statistical analysis

In the initial analysis, Kaplan-Meier survival analysis was used to estimate the probability of first Smoking and family process criteria. Samples are set in periodic personal files, and each section is for participants who did not smoke at the age 15, and any adolescents who reported Smoking before the study were excluded from the risk set. Next, logistic regression models were used to determine whether smokers differed from non-smokers. Discrete event history analysis was performed to initiate smoking with time-varying predictor variables. The question is whether predictors of socialization (e.g., family process and peer influence) can account for the transition from non-use to first use. Event history models: creating a risk set. In addition, a Piecewise linear strip was added to the analysis to approximate age correlation. Next year's data were deleted when the teen reported first smoking. The analysis was performed with three models. Model 1 included family process criteria, model 2 was analyzed using peer influence criteria, and control variables were added to the family process and peer influence criteria.

### 3. Results

Women were more likely to be healthy, and half of the samples were white. Sixty percent of the sample reported low levels of sport, and the majority were in families with no sport. Model 1 shows that adolescents with high levels of sport were less likely to smoke before the age of 16, and moderate sport was associated with a 15% reduction in the risk of Smoking. Women smoke less than men, and the same is true for blacks compared to whites. Children separated from the family are 20% more likely to smoke, and parental education has nothing to do with smoking. After controlling the correlation variable, no significant relationship was observed between sport and smoking. The figure shows that people who are more involved in sports are less likely to smoke during adolescence.

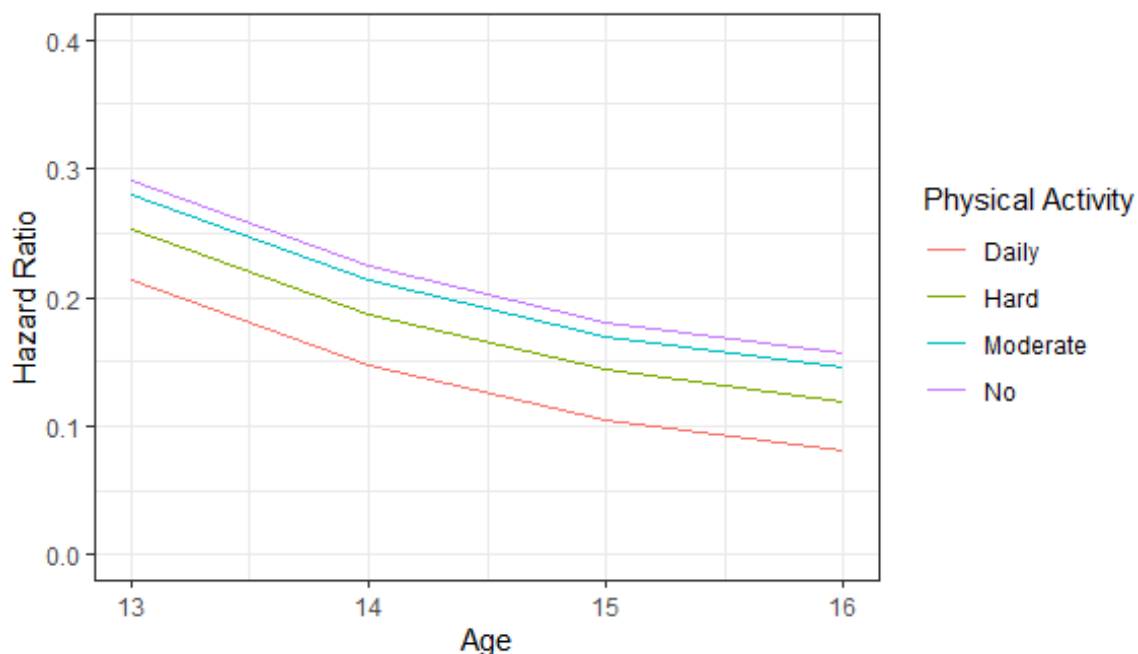


Figure 1. Onset of Smoking by physical Activity within the Family

## Family Activities and Smoking among Adolescents

# Family Activities and Smoking among Adolescents

**Table 1.** Logistic Regression Models (NLSY97).

Predictors	Odds Ratios	CI	p	Odds Ratios	CI	p	Odds Ratios	CI	p	Odds Ratios	CI	p
(Intercept)	0.23	0.21 - 0.25	<0.001	0.28	0.24 - 0.31	<0.001	0.23	0.20 - 0.27	<0.001	0.26	0.21 - 0.32	<0.001
Family Sport (No)	Reference			Reference			Reference			Reference		
High	0.61	0.47-0.78	<0.001	0.57	0.41 - 0.76	<0.001	0.83	0.56 1.20	0.338	0.76	0.47 1.17	0.225
Low	0.95	0.87 - 1.04	0.292	0.93	0.84-1.03	0.156	0.96	0.82 1.13	0.602	0.88	0.74 1.06	0.189
Moderate	0.85	0.75 - 0.97	0.016	0.91	0.78 - 1.06	0.222	0.85	0.69 - 1.06	0.149	0.80	0.62 - 1.03	0.080
Gender (Male)	Reference			Reference			Reference			Reference		
Female				0.83	0.76-0.90	<0.001				0.88	0.75 - 1.04	0.124
Race (White)	Reference			Reference			Reference			Reference		
Black				0.72	0.65 - 0.81	<0.001				0.85	0.69 1.04	0.119
Hispanic				0.89	0.79 1.01	0.077				0.88	0.69 1.11	0.279
Mixed				1.54	0.89 2.57	0.107				1.21	0.64 - 2.15	0.533
Family Structure (Intact)	reference			Reference			Reference			Reference		
Parental Divorce				1.20	1.07 - 1.35	0.002				0.91	0.75 - 1.10	0.339
Mother Education (Academic)				Reference			Reference			Reference		
High School				0.99	0.89-1.11	0.917				1.18	0.98 1.43	0.073
Less than High School				1.09	0.94 - 1.26	0.234				1.48	1.11 1.96	0.007
Father Education (Academic)				Reference			Reference			Reference		
High School				1.00	0.90 1.12	0.954				0.91	0.75 1.10	0.324
Less than High School				0.92	0.79 - 1.07	0.270				0.85	0.64 1.13	0.269



**Table 2.** Logistic Regression Models (NLSY97)

Variables		Healthy (N=14270)	Not Healthy (N=4442)	Overall (N=18712)
Gender	Male	6228 (43.6%)	2146 (48.3%)	8374 (44.8%)
	Female	8042 (56.4%)	2296 (51.7%)	10338 (55.2%)
Race	White	7156 (50.1%)	2574 (57.9%)	9730 (52.0%)
	Black	3698 (25.9%)	1097 (24.7%)	4795 (25.6%)
	Hispanic	3343 (23.4%)	707 (15.9%)	4050 (21.6%)
	Mixed	73 (0.5%)	64 (1.4%)	137 (0.7%)
Sport	High	450 (3.2%)	165 (3.7%)	615 (3.3%)
	Low	8604 (60.3%)	2509 (56.5%)	11113 (59.4%)
	Moderate	1748 (12.2%)	684 (15.4%)	2432 (13.0%)
	No	3468 (24.3%)	1084 (24.4%)	4552 (24.3%)
Family Structure	Intact Family	11910 (83.5%)	3420 (77.0%)	15330 (81.9%)
	Parental Divorce	2360 (16.5%)	1022 (23.0%)	3382 (18.1%)
Mother Education	Some college and more	6661 (46.7%)	2274 (51.2%)	8935 (47.8%)
	High School	4648 (32.6%)	1483 (33.4%)	6131 (32.8%)
	Less than High School	2961 (20.7%)	685 (15.4%)	3646 (19.5%)
Father Education	Some college and more	5691 (39.9%)	2057 (46.3%)	7748 (41.4%)
	High School	5422 (38.0%)	1725 (38.8%)	7147 (38.2%)
	Less than High School	3157 (22.1%)	660 (14.9%)	3817 (20.4%)

#### 4. Discussion and Conclusion

Today, family activities are considered an essential factor for children and adolescents. The present study hypothesized that regular family activities were associated with positive health practices and reduced smoking. Consistent with the present study, previous research also supports the hypothesis that family activities are associated with lower substance use and smoking (5, 7, 11, 22, 23). Mahabee-Gittens et al. (13) showed that family effects are significantly associated with smoking prevention. Family activities are a tool that parents try to use to socialize their children with their attitudes and are ways for parents to connect with their children to prepare them for future stressors. Family activities or when families regularly engage in activities for their children can positively affect their children, including improving health and quality of life and reducing depression and drugs and nicotine dependence. So that the existence of more vital family factors such as supervision, closeness and intimacy of parents and adolescents, and constant discipline protects children, even if there is a high level of risk for them to start smoking (13). Sharma et al. (3) stated that the family structure has become more complex, and we are witnessing a change from the traditional family to single-parent families, stepmother families, adopted child families, and multi-generational households. Therefore, when a family member starts an activity, such as Smoking in any way, the whole

family, including children, are affected. It can be explained that nicotine dependence seems to occur "in the family" and that children who grow up in families with nicotine dependence may repeat it in their adult behavior based on what they have seen from their family experience and learned; Thus, nature and upbringing both affect a person's vulnerability or resistance to such drug addiction. Finally, in explaining the effects of family activities on Smoking, it can be stated that these cases are supported by ecological theory, which shows that children are initially affected by their immediate and close actors, which is the family. Family and parenting processes are defined as intimacy factors, directly and indirectly, related to children's competencies that can predict adolescent Smoking and drinking behavior (24).

Women also smoke less than men, and blacks smoke less than whites. Consistent with the present study, Heydari et al. (25) showed that the prevalence of smoking in women is lower than in men. Mahabee-Gittens et al. (13) showed no statistically significant difference in gender for smoking status in youth. However, Yousefi Il Zoleh (26) showed that male and female students have different perceptions of smoking and are encouraged to smoke for various reasons. World Health Organization findings in 151 countries show that 7% of adult girls smoke; While this figure is about 12% in adult boys. Differences in the lived experience of Smoking between men and women indicate that different smoking patterns prevail, especially in terms of motivation, conditioning, and facilitating conditions. At the same time, the family atmosphere and environment, to some extent, pave the way for smoking among girls and boys. In this regard, Audrain-McGovern et al. (9) showed no difference between Smoking based on race. Mahabee-Gittens et al. (13) showed that more parental supervision, more intention to control and communicate more against Smoking played a protective role among Hispanics, while more parental punishment and a favorable attitude towards supervision were protective agents against smoking among blacks. In general, they showed a high level of family influence to protect against Smoking among all racial/ethnic groups. Ellickson et al. (8) also showed that the highest smoking rates were among whites, followed by Hispanics and black youth. Lack of parent-adolescent closeness, inadequate discipline, and ineffective supervision may have led to more smoking among whites.

Children separated from the family are 20% more likely to smoke, and parental education has nothing to do with smoking. Also, parental education has nothing to do with smoking. The issues mentioned in this study showed that the family has a positive effect on their children's behaviors. Therefore, if a child is separated from family, it will naturally harm the child. Parents' activities against their children's smoking are essential because they are the primary role models for adolescents. Parents' attitudes toward smoking, their understanding of Smoking, and the love between parents and their children are important factors influencing adolescent Smoking. However, frequent disagreements with parents, parental divorce, abuse by family members, underage parents, and poor family relationships all play a role in adolescents' risk of Smoking. Park (27) stated that reducing adolescent smoking rates is not possible only through social constraints such as stereotyped education such as educating parents about the smoking risk, which is consistent with the present study. Therefore, instead of forcing children not to smoke, it is better to fully explain the harmful effects of Smoking on

physical growth and mental health, as well as to convince them that Smoking causes social problems as well as a facilitating factor for other drugs, it can reduce the tendency to smoke and drug use among young people. The results are also inconsistent with Heidari et al. (4) and Kandel et al. (28), who showed that education has a significant relationship with Smoking; But the research of Heidari et al. (4) showed that the level of education of parents does not have a significant effect on occasional Smoking and the daily use of students. Inconsistent findings can be related to methodological differences (such as statistical population and measurement), culture and social differences, etc.

The results indicate that adolescents with high levels of physical activity were less likely to smoke before the age of 16, and moderate sport was associated with a 15% reduction in the risk of smoking. Therefore, people who have high physical activity are less likely to smoke during adolescence. The results are consistent with Maziar et al., (17); Audrain-McGovern et al., (9); Efendi et al., (2); Inthachai et al., (19) and inconsistent with Ahmadabadi et al. (21). Audrain-McGovern et al. (9) showed that higher levels of physical activity reduce the chance of progressing to smoking or high levels of smoking by about 1.5 and may reduce the risk of smoking during adolescence. However, some studies have not reported consistent results (29). In general, consistent research has suggested that sport helps prevent prevention through mechanisms such as reducing stress and anxiety, increasing self-esteem, decision-making, resisting other people's insistence, improving self-image, and becoming more aware of the harmful effects of drugs.

In contrast, some groups identified several other sports activities as risk factors for smoking, drug and alcohol use and found that a competitive culture and the pressure to succeed could lead to such risky behaviors (29, 30). Sport and physical activity increase serotonin, increasing happiness and vitality in addicted people and reducing substance use and Smoking. For example, according to social capital theory, membership in sports teams and clubs is a form of social participation that can help promote healthy behaviors. These methods include increasing awareness and information, filling leisure time, reducing opportunities to participate in high-risk activities, and continuous social control (21). However, social participation does not always have an entirely positive effect on participants. Sometimes, group norms and values (delinquent groups) may be at odds with individual and social health, where adherence to such norms and values endangers participants' health. In this regard, a group of studies has examined the negative role of sports team membership on behavioral health (31, 32).

The literature has focused more on cross-sectional data. This study develops the previous literature by considering the long-term consequences of family activity during adolescence and smoking. Future efforts are essential to replicate the results of the present study in large samples involving different groups of young people and determine how these findings can inform future parental smoking prevention interventions. They should develop standard programs and make relevant efforts to significantly reduce the smoking rate of adolescents in society. Because the home or school environment strongly influences adolescent smoking, it is necessary to work on practical education and social empowerment at school, establishing relevant norms, and implementing preventive education using peer groups. When these efforts

are expanded with the cooperation of parents and communities throughout the community, it will also be beneficial for maintaining the health of adolescents and improving their quality of life.

## References

1. Jeon HG, Kim G, Jeong HS, So W-Y, editors. Association between Cigarette Smoking and Physical Fitness Level of Korean Adults and the Elderly. *Healthcare*; 2021; 9:9(2):185.
2. EfENDİ V, ÖZALEVLİ S, NAZ İ, Kılınç O. The effects of smoking on body composition, pulmonary function, physical activity and health-related quality of life among healthy women. *Tuberk Toraks*. 2018;66(2):101-8.
3. Sharma R, Martins N, Tripathi A, Caponnetto P, Garg N, Nepovimova E, et al. Influence of family environment and tobacco addiction: A short report from a Post-Graduate Teaching Hospital, India. *International journal of environmental research and public health*. 2020;17(8):2868.
4. Heidari G. The effect of family on Smoking of high school students in Tehran. *Journal of Iranian Medical System*. 2003;21(1):24-31.
5. Dwivedi S, Aggarwal A, Singh N, Aggarwal S, Sharma V. Role of family milieu in tobacco addiction: A study in a tertiary-care institution in India. *Journal of health, population, and nutrition*. 2013;31(1):130.
6. Colder CR, Mehta P, Balanda K, Campbell RT, Mayhew K, Stanton WR, et al. Identifying trajectories of adolescent smoking: an application of latent growth mixture modeling. *Health Psychology*. 2001;20(2):127.
7. Stattin H, Kerr M. Parental monitoring: A reinterpretation. *Child development*. 2000;71(4):1072-85.
8. Ellickson P, Orlando M, Tucker J, Klein D. Erratum: From adolescence to young adulthood: Racial/ethnic disparities in smoking (American Journal of Public Health (2004) 94 (293-299)). *American Journal of Public Health*. 2004;94(4):520-.
9. Audrain-McGovern J, Rodriguez D, Moss HB. Smoking progression and physical activity. *Cancer Epidemiology and Prevention Biomarkers*. 2003;12(11):1121-9.
10. Grunbaum JA, Kann L, Kinchen SA, Williams B, Ross JG, Lowry R, et al. Youth risk behavior surveillance—United States, 2001. *Journal of School Health*. 2002;72(8):313-28.
11. Wells AU, Nicholson AG, Hansell DM. Challenges in pulmonary fibrosis- 4: Smoking-induced diffuse interstitial lung diseases. *Thorax*. 2007;62(10):904-10.
12. Bardsley JM. Computational uncertainty quantification for inverse problems: *SIAM*; 2018.
13. Mahabee-Gittens EM, Xiao Y, Gordon JS, Khoury JC. The role of family influences on adolescent smoking in different racial/ethnic groups. *Nicotine & Tobacco Research*. 2012;14(3):264-73.
14. Peretti-Watel P, Beck F, Legleye S. Beyond the U-curve: the relationship between sport and alcohol, cigarette and cannabis use in adolescents. *Addiction*. 2002;97(6):707-16.
15. Audrain J, Lerman C, Main D, editors. Physical activity and smoking in adolescents: A pilot study. Poster session presented at the Annual Meeting of the Society for Research on Nicotine and Tobacco; 2000.
16. Aaron DJ, Dearwater SR, Anderson R, Olsen T, Kriska AM, Laporte RE. Physical activity and the initiation of high-risk health behaviors in adolescents. *Medicine & Science in Sports & Exercise*. 1995.
17. Maziar K, editor The role of sports and physical activities in creating a healthy society emphasizes reducing crime and Smoking. The first scientific conference of the Iranian Association of Physical Education and Sports Sciences; 2014; Tehran.
18. Peretti-Watel P, Guagliardo V, Verger P, Pruvost J, Mignon P, Obadia Y. Sporting activity and drug use: Alcohol, cigarette and cannabis use among elite student athletes. *Addiction*. 2003;98(9):1249-56.
19. Inthachai T, Demekul K, Phonsatsadee N, Puttittommagool P, Boonyachart N. Effects of physical activity and smoking on cardio-ankle vascular index, respiratory muscle strength, and exercise performance in early normal weight adulthood: a cross-sectional study. *Journal of exercise rehabilitation*. 2019;15(6):804.
20. Voorhees CC, Schreiber GB, Schumann BC, Biro F, Crawford PB. Early predictors of daily smoking in young women: the national heart, lung, and blood institute growth and health study. *Preventive medicine*. 2002;34(6):616-24.
21. Ahmadabadi S. Sports Activity and Smoking, Alcohol and Drug Abuse among Students. *Annals of Applied Sport Science*. 2018;6(1):47-56.
22. Barnes GM, Reifman AS, Farrell MP, Dintcheff BA. The effects of parenting on the development of adolescent alcohol misuse: a Six-Wave latent growth model. *Journal of Marriage and Family*. 2000;62(1):175-86.
23. Fletcher AC, Steinberg L, Williams-Wheeler M. Parental influences on adolescent problem behavior: Revisiting Stattin and Kerr. *Child development*. 2004;75(3):781-96.
24. Wattananonsakul S, Suttiwan P, Iamsupasit S. Pathways to smoking and drinking: The role of family functioning, supportive parenting, self-control, risk and protective factors in Thai adolescents. *Journal of Health Research*. 2010;24(3):135-42.
25. Heydari G, Hosseini M, Yousefifard M, Asady H, Baikpour M, Barat A. Smoking and physical activity in healthy adults: a cross-sectional study in Tehran. *Tanaffos*. 2015;14(4):238.

## Family Activities and Smoking among Adolescents

26. Yousefi Il Zoleh F. Gender-based Smoking among students of Kharazmi University, : Kharazmi University; 2019.
27. Park S-h. Smoking and adolescent health. Korean journal of pediatrics. 2011;54(10):401.
28. Kandel DB, Kiros G-E, Schaffran C, Hu M-C. Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: a multilevel analysis. American Journal of Public Health. 2004;94(1):128-35.
29. de Grace LA, Knight CJ, Rodgers WM, Clark AM. Exploring the role of sport in the development of substance addiction. Psychology of Sport and Exercise. 2017;28:46-57.
30. Melnick MJ, Miller KE, Sabo DF, Farrell MP, Barnes GM. Tobacco use among high school athletes and nonathletes: Results of the 1997 Youth Risk Behavior Survey. Adolescence. 2001;36(144):727.
31. Zadeh MA, Ahmadabadi Z, Ahmadabadi S, Rafeei BM. Sport and Risk-Taking against Substance Abuse in students of Tehran High Schools. 2010.
32. Rodriguez D, Audrain-McGovern J. Team sport participation and smoking: Analysis with general growth mixture modeling. Journal of Pediatric Psychology. 2004;29(4):299-308.