RESEARCH ARTICLE

Family Context Factors and the Risk of Smoking among Male Adolescents in Saudi Arabia

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Abstract

Background: Smoking behavior is related to numerous factors, including psychosocial parameters. This study investigated the association between family context factors and smoking among male adolescents. Materials and Methods: A cross-sectional, school-based study was conducted during 2014. The study sampled 900 students from intermediate and secondary schools in Madinah City, Saudi Arabia. Data concerning smoking status, sociodemographic, parental and friends' smoking behavior, and family factors were collected using a self-administered questionnaire. These data were employed to estimate the prevalence of smoking using appropriate statistical analyses including multivariate logistic regression. Results: Of 900 students, 870 completed the study questionnaire (96.7%). Of the respondents, 181 students (20.8%, 95% CI=18.1%-23.5%) were current smokers, and a much higher prevalence was observed among adolescents with most or all of their friends smoking (48.1%) and those living with neither parent (47.4%). The adjusted risk of smoking increased significantly among adolescents who lived with neither parent (OR=3.3; 95% CI=1.1-9.2) and among those who reported little or no parental supervision (OR=1.5; 95% CI=1.0-2.1). Conclusions: Family context factors are associated with an increased risk of smoking behavior among male adolescents in Saudi Arabia.

Keywords: Smoking prevalence - adolescence - family characteristics - risk factors - Saudi Arabia

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Introduction

Cigarette smoking and its health consequences represent one of the most serious public health concerns and a crucial global health issue (Warren et al., 2008). The age of smoking initiation is an important determinant of tobacco addiction (Unger and Chen, 1999). Adolescents who begin to smoke at younger ages are more likely to become regular smokers and less likely to quit (Tyas and Pederson, 1998). It has been reported that more than 80% of adult smokers began cigarette smoking at or before the age of eight (Alexander et al., 2001). In Saudi Arabia, among individuals aged 15 years or older, approximately 37.6% of males and 6% of females are tobacco current smokers (World Health Organization 2008).

Adolescence is a critical period characterized by physiological and behavioral changes that can be affected by the social environment (Gladwin et al., 2011), Having divorced parents and living in non-standard family structures such as single parent families have been associated with an increased likelihood of risky behaviors among adolescents such as smoking, drinking alcohol, substance abuse, and risky sexual behaviors (Kirby, 2002; Orgilés et al., 2012; Carlsund et al., 2013), There is also evidence that perceived parental support and trust reduce the likelihood of smoking, drinking alcohol and risky sexual behaviors, (Borawski et al., 2003) while mixed results have been reported concerning the relationship between parental support and physical activity (Peterson et al., 2013). Parental supervision and monitoring have been associated with smoking and other risky health behaviors such as consuming alcohol, the early onset of sexual activity and unsafe sexual practices (Mahabee-Gittens et al., 2012; Kaynak et al., 2013; Kalina et al., 2013). However, there is growing evidence that family context factors are modulated by ethnic background (Mahabee-Gittens et al., 2012; Shapka and Law, 2013). The impact of family factors may vary among ethnic groups.

The influence of family factors on Saudi adolescents' smoking behavior has yet to be fully investigated. Investigating and understanding the social and familial context of smoking behavior among adolescents may aid in the design of appropriate and effective smoking prevention programs. The present school-based, cross-sectional study aims to investigate the association between family factors and male adolescent smoking behavior.

Materials and Methods

This school-based, cross-sectional study analyzed data from male intermediate and secondary school students in Madinah City, Saudi Arabia during the year 2014 to

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investigate the association between family factors and adolescent smoking.

A multistage, stratified cluster sampling procedure was employed in which intermediate and secondary schools were defined as two strata. The sample size selected from each stratum was proportional to the size of the stratum in Madinah City. Within each stratum, a cluster sampling technique was implemented in which the primary sampling unit was the school. Within each school, one class from each grade was randomly selected. All students in each selected class were included in the sample.

Data were collected through a self-administered, structured questionnaire. The questionnaire employed in this study was formulated based on a review of the medical literature. The questionnaire addresses the following four domains: smoking status, sociodemographic features, parental and best friends' smoking factors, and family structure and relationship factors. The validity of the questionnaire was determined on the basis of discussions with public health and tobacco-control experts.

Smoking status was assessed by the following questions: "Have you ever tried smoking a cigarette, even once?", "During the past 30 days (one month), on how many days did you smoke cigarettes?" and "On average, how many cigarettes do you smoke per day?". Never smokers were defined as students who had never tried smoking; current smokers were students who had smoked at least once in the past 30 days; while ex-smokers were students who had not smoked in the past 30 days but tried smoking cigarettes in their lifetime.

The independent variables in this study were grouped into three domains as follows: *i)* sociodemographic characteristics, including age in years (≤13, 14, 15, ≥16), school level (intermediate vs. secondary), pocket money per day (≤100 SR vs. >100 SR), maternal and paternal education (No formal education, basic education and university or higher). *ii)* Parental and best friends' smoking: parental smoking (none, both parents smoke, father only, mother only), best friends' smoking (none, some, most or all). *iii)*. Family characteristics: family composition (lives with father and mother, lives with father only, lives with mother only, and lives with neither), perceived parental support in problem solving (more support vs. less and no support), parental supervision (more supervision vs. less and no supervision), and time spent with parents (more time vs. less and no time). Perceived parental support was assessed by asking the student to select one of the 4 response options concerning

Table 1. Characteristics of Surveyed Adolescents by their Smoking Status

Characteristics		Smokers (n=181)		Non smokers (n=689)		*P* value
		No.	%*	No.	%*	
(i) Sociodemographic characteristics						
Age group in years	≤ 13	18	20	72	80	
	14-	20	15	114	85	
	15-	27	16.5	137	83.5	
	≥ 16	116	24.1	366	75.9	0.04**
School level	Intermediate	88	18.2	394	81.8	
	Secondary	93	24	295	76	0.04**
Pocket money per month	≤ 300 SR	152	19.7	621	80.3	
	> 300 SR	29	30	68	70	0.02**
Father's education	No formal education	13	22	46	78	
	Less than university	107	20.5	414	79.5	
	University and higher	61	21	229	79	0.95
Mother's education	No formal education	22	26.8	60	73.2	
	Less than university	116	20.4	440	79.6	
	University and higher	43	18.5	189	81.5	0.28
(ii) Parental and friends' smoking						
Parental smoking	No	132	19.4	548	80.6	
	Father only	44	25.4	129	74.6	
	Mother only	2	50	2	50	
	Both	3	23.1	10	76.9	0.16
Friends smoking	No	26	7.4	327	92.6	
	Some	80	22.2	281	77.8	
	Most or all	75	48.1	81	51.9	<.0001**
(iii) Family context factors						
Family structure	Lives with both parents	154	20.5	599	79.5	
	Lives with father only	5	14.3	30	85.6	
	Lives with mother only	13	20.6	50	79.4	
	Lives with neither	9	47.4	10	52.6	0.03**
Parental support	More support	134	20	543	80	
	Less/no support	47	24.5	146	75.6	0.19
Parental supervision	More supervision	114	19.2	481	80.8	
	Less/no supervision	67	24.4	208	75.6	0.07
Parental time spent	More time spent	110	20.5	428	79.5	
	Less/no time spent	71	21.4	261	78.6	0.74

*Percentages of characteristic categories are presented according to smoking status; **Significant

parental support as follows: "Do your parents support you when you faced a problem? - always, sometimes, rarely, never". Reponses of "always" and "sometimes" were categorized as more support, while "rarely" and "never" were categorized as less and no. Analogous procedures were applied for parental supervision and parental time spent.

The ethics committee at College of Medicine approved the protocol. The school officials were informed of the aim and scope of the study. Participation in the study was voluntary. Before the data collection, consents were obtained from students as well as from their guardians. The confidentiality and privacy of the collected data were insured throughout the study.

Table 2. Adjusted odds Ratios (ORs) and 95% Confidence Intervals (CIs) for the Association between Family Context Factors and Adolescent Smoking

	Smokers (n=181)	Non smokers (n=689)	OR*	95% CI
Family structure				
Lives with both parents	154	599	1	Ref.
Lives with father only	5	30	0.68	0.24-1.89
Lives with mother only	13	50	0.83	0.42-1.64
Lives with neither	9	10	3.3	1.16-9.21**
Parental support				
More support	134	543	1	Ref.
Less/no support	47	146	1.15	0.75-1.73
Parental supervision				
More supervision	114	481	1	Ref.
Less/no supervision	67	208	1.5	1.01-2.14**
Parental time spent				
More time spent	110	428	1	Ref.
Less/no time spent	71	261	1.1	0.70-1.53

*OR are adjusted by age group, school level, pocket money, and parental and friends' smoking; **Significant

All data analyses were performed using the Statistical Analysis System software package (SAS, 1999). Descriptive statistics were used to compare the characteristics of the studied adolescents by their smoking status. The level of statistical significance was defined as $P<0.05$. Multivariate logistic regression analyses were conducted to estimate odds ratios (OR) and their 95% confidence intervals (95% CI) to assess the association between smoking and the family context factors while controlling for the potential confounders.

Results

A total of 900 intermediate and secondary schools were recruited for the study. The overall response rate was 96.7%. A total of 181 of 870 respondents were current smokers (20.8%, 95% CI=18.1%-23.5%). Table 1 presents the students' characteristics by their smoking status. Concerning the sociodemographic characteristics, statistically significant differences were observed between smokers and non-smokers adolescents regarding their age, school level and pocket money. The smoking prevalence was higher among secondary school students (24.0%), aged ≥ 16 years (24.1%) and those reporting more than 300 SR in monthly pocket money (30.0%). There were no statistically significant differences, however, regarding the parental educational level of smoker and non-smoker adolescents in the sample, although a higher share of smokers was observed for the no-formal-education parents group. Adolescent smoking status also exhibited statistically significant differences by friends' smoking ($p<0.0001$). Smoking prevalence was higher among adolescents reporting that their mother (50.0%), father (25.4%) or both (23.1%) smoke and among respondents for whom most or all of their best friends smoke (48.1%). Regarding the family context factors, a statistically

Table 3. Adjusted Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for the Association between Family Context Factors And Adolescent Smoking by School Level

		Smokers	Non smokers	OR*	95% CI
Secondary school students (n= 388)					
Family structure	Lives with both parents	80	263	1	Ref.
	Lives with father only	4	11	1.35	0.32-5.80
	Lives with mother only	5	17	0.52	0.16-1.66
	Lives with neither	4	4	3.37	0.65-17.2
Parental support	More support	61	233	1	Ref.
	Less/no support	32	62	1.7	0.43-2.97
Parental supervision	More supervision	59	224	1	Ref.
	Less/no supervision	34	71	1.5	0.85-2.65
Parental time spent	More time spent	57	201	1	Ref.
	Less/no time spent	36	94	1.05	0.60-1.82
Intermediate school students (n= 482)					
Family structure	Lives with both parents	44	336	1	Ref.
	Lives with father only	1	19	0.25	0.10-1.93
	Lives with mother only	8	33	0.98	0.40-2.33
	Lives with neither	5	6	3.6	0.92-14.0
Parental support	More support	73	310	1	Ref.
	Less/no support	15	84	0.7	0.37-1.38
Parental supervision	More supervision	55	257	1	Ref.
	Less/no supervision	33	137	1.25	0.73-2.16
Parental time spent	More time spent	53	227	1	Ref.
	Less/no time spent	35	167	0.99	0.59-1.64

*OR are adjusted by age group, pocket money, parental and friends' smoking

significant difference was observed between smoker and non-smoker adolescents having different family structure where the prevalence of smoking was much higher among students who do not live with their parents (47.4%) than those who live with their mother and father (20.5%), with their mothers only (20.6%) or with their fathers only (14.3%). In addition, the prevalence of adolescent smoking was higher among those receiving less parental supervision (24.2% vs. 19.2%, p=0.07) and less parental support (24.5% vs. 20.0%, p=0.19), although the latter was not statistically significant.

Table 2 presents the adjusted odds ratios and their 95% confidence intervals for the association between adolescent smoking and the family context factors considered. Living with neither parent appeared to have a significant effect on the risk of adolescent smoking with an adjusted odds ratio of 3.30 (CI=1.16-9.21). Further, the risk of smoking is significantly higher among adolescents reporting less parental supervision (OR=1.50; 95% CI=1.01-2.14). However, the time spent with parents as well as parental support appeared to have no effect on adolescent smoking behavior, with an adjusted OR of 1.1 (95% CI=0.70-1.53) and 1.15 (0.75-1.73) respectively.

Table 3 presents the adjusted odds ratios and their 95% confidence intervals for the association between smoking and the family context factors considered by the school level of the adolescents surveyed. The adjusted risk of smoking was 3.4, 1.7, and 1.5 among secondary school adolescents living with neither parent, reporting less or no parental support and less or no parental supervision, respectively. The role of these factors, however, was substantially weaker among intermediate school students reporting less or no parental support and less or no parental supervision, with an adjusted OR of 0.7, and 1.2 respectively.

Discussion

This school-based, cross-sectional study revealed a considerable prevalence of smoking among male adolescents in Madinah City, Saudi Arabia. The estimated prevalence was 20.8%, and a higher prevalence was observed among secondary school students (24.0%). A similarly high prevalence of adolescent smoking ranging between 29% and 37% was also reported in recent studies conducted in different regions of Saudi Arabia (Al Nohair 2011; Al Ghobain et al., 2011; Fida and Abdelmoneim, 2013).

Most previous studies in Saudi Arabia did not clearly address the role of family structure and relationships as a risk factor for adolescent smoking. The aim of the present study was to investigate this role with a focus on the following family factors: family structure, perceived parental support, parental supervision, and parental time spent with adolescents. The findings revealed significantly increased risks of adolescent smoking in association with family structure, parental support and parental supervision. Compared to adolescents living with both parents, the risk of smoking is significantly higher among those living with neither parent, with an adjusted OR of 3.3 (95% CI=1.16-9.21). Similarly, a recent Saudi study analyzed the risk of adolescent smoking in relation to family structure and reported similar findings (Gaffar et al., 2013). That study observed a lower prevalence of smoking among adolescents who lived with both parents (16.8%) compared to those who lived with one parent (father (19.5%) or mother (18.3%), relatives (27.6%), or living alone (34.6%). In addition to calculating the risk of engaging in smoking behavior, the present study also stratified the risk by school level. The stratified analysis revealed a high risk, although non-significant, of smoking among both secondary and intermediate school students living with neither parents, with a higher risk among intermediate school students (OR=3.6; 95% CI=0.92-14.0). These findings are in keeping with results from previous studies showing that a non-standard family composition is associated with risky health behaviors among adolescents (Isohanni et al., 1993; Du et al., 2015). The mechanism driving this relationship is not completely understood, although it has been suggested that the psychological impact of such arrangements on adolescents might play a role (Kirby, 2002). A previous study in Malaysia found that parent-teen conflict, which is common in non-standard families, could lead to experimenting smoking (Jeganathan et al., 2013).

This study also revealed a statistically significant increased risk of smoking among adolescents reporting less or no parental supervision, with an adjusted OR of 1.50 (95% CI=1.01-2.14). These associations are consistent with the results of a population-based study conducted to examine social factors associated with adolescent smoking in Iceland (Kristjansson et al., 2008). The authors reported a significant and positive association between parental support and parental control using relatively crude analytical models. The risk was 2.0 (95% CI=1.7-2.4) among adolescents reporting less parental support and 2.4 (95% CI=2.0-2.9) among those reporting less parental control. Other studies have also revealed an association between parental supervision and monitoring and smoking behavior.(Mahabee-Gittens et al. 2012; Baheiraei et al. 2013) Moreover, children perception about harms and benefits of smoking was found to be affected by parents attitudes (Ozturk et al., 2013). Further studies are needed to identify the precise aspects of parental monitoring that affect smoking behavior. One previous study indicates concrete rules established by parents are more effective than general monitoring and knowing about the whereabouts of adolescents (de Looze et al., 2012). Other studies indicated that

The current study did not observe an association between time spent with parents and smoking behavior. This is contrary to the results reported by Kristjansson et al. indicating that the quantity of time spent with parents reduced the likelihood of smoking behavior.(Kristjansson et al. 2008) The family cohesion and bonds were found to predict smoking initiation (Rajesh et al., 2015). The quality, rather than the quantity, of time may be more important, and this represents a possible explanation for these divergent results. The difference in results could also be related to cultural differences, which may affect how parents spend time with their children.

The findings of the present study reflect the role of

family and the influence of its structure and relationships on the risk of smoking in adolescents. Moreover, the findings are not restricted to assessments of the impacts of parental educational attainment and income and reflect the effects of additional family characteristics (relative to prior studies) on adolescent smoking behavior, including sound family relations, psychosocial support, supervision and monitoring.

The present study has a number of apparent strengths that include being a school-based study with a high response rate among interviewed adolescents, which supports the robustness of its findings. To our knowledge, no prior study has assessed the association between the risk of adolescent smoking and a number of family context factors in Madinah City or most regions of Saudi Arabia. Moreover, all risks regarding the association between adolescent smoking and family context factors were estimated using multivariate logistic regression and controlling for most known confounders.

However, the limitations of this study should not be overlooked. The validation of self-reports via biochemical tests was not feasible due to logistical and cultural constraints. A review of validation studies indicated that a reliance of self-reported data is generally associated with underestimates of smoking status and varying sensitivity levels according to the population studied (Connor Gorber et al., 2009). Furthermore, the findings of this study, particularly those presented in the stratified analyses, must be interpreted with caution because of the reduced sample size and the small number of subjects included in the factor categories considered.

In conclusion, the present study found a general adolescent smoking prevalence of 20.8% with significant school level and age group differences. The main family context risk factor implicated in male adolescent smoking was family structure and composition, and this risk was much higher risk among intermediate school adolescents. Furthermore, parental support and parental supervision appeared to play a role in the risk of smoking among these adolescents. Conversely, parental time spent with adolescents appeared to play little or no role in the risk of adolescent smoking. Further studies, including both males and females, are necessary to confirm the findings of this study. Confirmed information concerning the role of family context factors in the risk of adolescent smoking may help policy makers design an appropriate and effective smoking prevention program for this important segment of the Saudi population.

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