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

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
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 |
|-----------------------------------------------|----------------|---------------------|---------|
| (i) Sociodemographic characteristics           |                |                     |         |
| Age group in years                            |                |                     |         |
| ≤ 13                                          | 18             | 72                  | 0.04**  |
| 14-                                           | 20             | 114                 |         |
| 15-                                           | 27             | 137                 |         |
| ≥ 16                                          | 116            | 366                 |         |
| School level                                  |                |                     |         |
| Intermediate                                  | 88             | 394                 | 0.04**  |
| Secondary                                     | 93             | 295                 |         |
| Pocket money per month                        |                |                     |         |
| ≤ 300 SR                                      | 152            | 621                 | 0.04**  |
| > 300 SR                                      | 29             | 68                  |         |
| Father’s education                            |                |                     |         |
| No formal education                           | 13             | 46                  | 0.02**  |
| Less than university                          | 107            | 441                 |         |
| University and higher                         | 61             | 229                 | 0.95    |
| Mother’s education                            |                |                     |         |
| No formal education                           | 22             | 60                  |         |
| Less than university                          | 116            | 440                 |         |
| University and higher                         | 43             | 189                 | 0.28    |
| (ii) Parental and friends’ smoking            |                |                     |         |
| Parental smoking                              |                |                     |         |
| No                                            | 132            | 548                 | 0.16    |
| Father only                                   | 44             | 129                 |         |
| Mother only                                   | 2              | 2                   |         |
| Both                                          | 3              | 10                  |         |
| Friends smoking                               |                |                     |         |
| No                                            | 26             | 327                 |         |
| Some                                          | 80             | 281                 |         |
| Most or all                                   | 75             | 81                  | <0.0001**|
| (iii) Family context factors                  |                |                     |         |
| Family structure                              |                |                     |         |
| Lives with both parents                       | 154            | 599                 | 0.03**  |
| Lives with father only                        | 5              | 30                  |         |
| Lives with mother only                        | 13             | 50                  |         |
| Lives with neither                            | 9              | 52.6                |         |
| Parental support                              |                |                     |         |
| More support                                  | 134            | 543                 |         |
| Less/no support                               | 47             | 146                 | 0.19    |
| Parental supervision                          |                |                     |         |
| More supervision                              | 114            | 481                 | 0.07    |
| Less/no supervision                           | 67             | 208                 |         |
| Parental time spent                           |                |                     |         |
| More time spent                               | 110            | 428                 | 0.74    |
| Less/no time spent                            | 71             | 261                 |         |

*Percentages of characteristic categories are presented according to smoking status; **Significant
Family Context Factors and Risk of Smoking among Male Adolescents in Saudi Arabia

parental support as follows: “Do your parents support you when you faced a problem? - always, sometimes, rarely, never”. Responses 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.

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 significant

| 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       | OR* 95% CI       |
| Family structure                  |                  |                  |
| Lives with both parents           | 599 1 Ref.       | 599 1 Ref.       |
| Lives with father only            | 30 0.68 0.24-1.89| 30 0.68 0.24-1.89|
| Lives with mother only            | 50 0.83 0.42-1.64| 50 0.83 0.42-1.64|
| Lives with neither                | 9 3.3 1.16-9.21**| 9 3.3 1.16-9.21**|
| Parental support                  |                  |                  |
| More support                      | 134 543 1 Ref.   | 134 543 1 Ref.   |
| Less/no support                   | 47 1.15 0.75-1.73| 47 1.15 0.75-1.73|
| Parental supervision              |                  |                  |
| More supervision                  | 114 481 1 Ref.   | 114 481 1 Ref.   |
| Less/no supervision               | 67 1.5 1.01-2.14**| 67 1.5 1.01-2.14**|
| Parental time spent               |                  |                  |
| More time spent                   | 110 428 1 Ref.   | 110 428 1 Ref.   |
| Less/no time spent                | 71 1.1 0.70-1.53 | 71 1.1 0.70-1.53 |

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

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

| Secondary school students (n=388) |
|---------------------------------|------------------|------------------|
| Family structure                |                  |                  |
| Lives with both parents         | 80 263 1 Ref.    | 80 263 1 Ref.    |
| Lives with father only          | 4 11 1.35 0.32-5.80| 4 11 1.35 0.32-5.80|
| Lives with mother only          | 5 17 0.52 0.16-1.66| 5 17 0.52 0.16-1.66|
| Lives with neither              | 4 3.37 0.65-17.2 | 4 3.37 0.65-17.2 |
| Parental support                |                  |                  |
| More support                    | 61 233 1 Ref.    | 61 233 1 Ref.    |
| Less/no support                 | 32 1.7 0.43-2.97 | 32 1.7 0.43-2.97 |
| Parental supervision            |                  |                  |
| More supervision                | 59 224 1 Ref.    | 59 224 1 Ref.    |
| Less/no supervision             | 34 1.5 0.85-2.65 | 34 1.5 0.85-2.65 |
| Parental time spent             |                  |                  |
| More time spent                 | 57 201 1 Ref.    | 57 201 1 Ref.    |
| Less/no time spent              | 36 1.05 0.60-1.82| 36 1.05 0.60-1.82|

Intermediate school students (n=482)

| Family structure                |                  |                  |
| Lives with both parents         | 44 336 1 Ref.    | 44 336 1 Ref.    |
| Lives with father only          | 1 19 0.25 0.10-1.93| 1 19 0.25 0.10-1.93|
| Lives with mother only          | 8 33 0.98 0.40-2.33| 8 33 0.98 0.40-2.33|
| Lives with neither              | 5 3.6 0.92-14.0  | 5 3.6 0.92-14.0  |
| Parental support                |                  |                  |
| More support                    | 73 310 1 Ref.    | 73 310 1 Ref.    |
| Less/no support                 | 15 0.7 0.37-1.38 | 15 0.7 0.37-1.38 |
| Parental supervision            |                  |                  |
| More supervision                | 55 257 1 Ref.    | 55 257 1 Ref.    |
| Less/no supervision             | 33 1.25 0.73-2.16| 33 1.25 0.73-2.16|
| Parental time spent             |                  |                  |
| More time spent                 | 53 227 1 Ref.    | 53 227 1 Ref.    |
| Less/no time spent              | 35 0.99 0.59-1.64| 35 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 (Jeganathan et al., 2013). Other studies indicated that the whereabouts of adolescents (de Looze et al., 2012). 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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