

Methods

Design, Setting and Study Population

During October 2015, we conducted this cross-sectional study among high school students in Hawally – one of the six governorates of Kuwait – to (i) assess the prevalence of environmental tobacco smoke (ETS) exposure mainly at home among high school students, (ii) assess the prevalence of atopic dermatitis among high school students and (iii) examine the association between ETS exposure and atopic dermatitis status. The main consideration in choosing this population was their known high frequency and duration of exposure to environmental tobacco and the expected high prevalence of atopic dermatitis. We obtained a list of schools from the Ministry of Education's website. From the list of 10 schools for boys, 9 schools for girls and 44 private schools with a coeducation system, we selected 9 schools, 3 public-sector schools each for male and female students and 3 private schools with coeducation.

Questionnaire

A structured and self-administered questionnaire was developed in English to seek data on sociodemographic variables, smoking status and exposure to ETS at home and in public areas. The standardized International Study of Asthma and Allergies in Childhood (ISAAC) core questionnaire was used for the diagnosis of atopic dermatitis. A respondent was considered to have atopic dermatitis, if he or she had had a recurrent itchy rash for at least 6 months with localization at the folds of the elbows, behind the knees, in front of the ankles or around the neck, or if he/she had been diagnosed to have atopic dermatitis by a physician [9]. The questionnaire was developed in English, and the final version was translated into Arabic for actual use. The questionnaire was pretested on 20 students similar to our potential study participants, and modifications were made as needed. The questionnaire comprised 21 questions and took on average 5 min for its completion.

Data Collection

From each of the selected schools, we intended to include about 100 students from various sections of 11th and 12th grades. For this purpose, we requested the respective school teachers in charge of the selected sections to get the questionnaire filled in by the students at the end of the class; the teachers were also to explain the study objectives to the students. Students were further informed that their participation in the study was voluntary and that the confidentiality of the collected information was assured. Subsequently, consenting students were requested to fill in the written consent form attached to the questionnaire. The same procedure was used for data collection both in private and public-sector schools. The study protocol was approved by the Institutional Ethics Committee. A formal permission was sought from the Ministry of Education to conduct this study at public-

sector schools and from the principals of the selected private-sector schools. In this analytical cross-sectional study, a sample of 380 students each in ETS-exposed and ETS-unexposed groups was considered adequate to achieve 85% power to estimate a prevalence ratio (PR) of 2.5 relating ETS exposure with atopic dermatitis in the study population assuming the proportion of students with atopic dermatitis in the ETS-unexposed group as 0.04 at a significance level of $\alpha = 0.05$. To accommodate any potential refusals, sample size was inflated to 450 students in each of the study groups.

Statistical Analysis

To characterize the study sample, descriptive statistics including mean (standard deviation) for quantitative variables and frequencies (%) for categorical variables were computed. The χ^2 test was used to evaluate the statistical significance of the association of each of the independent variables with atopic dermatitis status (yes vs. no). Since the odds ratio overestimates the association of predictors with common outcomes, we used unadjusted and adjusted PR as a measure of association between the independent variables and atopic dermatitis status. A univariable log-binomial regression model was used to quantify the magnitude of the unadjusted association of each of the categorical variables with atopic dermatitis status. The variables significantly ($p \leq 0.150$) related with atopic dermatitis status on univariable analysis were considered for inclusion in multivariable analysis. The final multivariable log-binomial regression model comprised variables which were independently and significantly ($p < 0.05$) related to atopic dermatitis status. Adjusted PR and their 95% confidence intervals were used to interpret the final model.