Exposure to environmental tobacco smoke and prevalence of asthma among adolescents in a Middle Eastern country

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Research article

Keywords: Environmental tobacco smoke, asthma, adolescents, Prevalence ratio, log-binomial model

DOI: https://doi.org/10.21203/rs.2.12684/v2

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Abstract

**Background:** There is increasing evidence linking exposure to environmental tobacco smoke (ETS) at homes to the development of asthma among adolescents. Few studies have addressed this issue in the Middle Eastern countries including Kuwait. Therefore, this study cross-sectional assessed the prevalence of ETS exposure at home, prevalence of asthma and other respiratory morbid conditions and examined the ETS exposure and personal smoking status as risk factors for self-reported asthma among high-school students in Kuwait.

**Methods:** During October 2015, a cross-sectional study design was implemented using a self-administered modified version of the ISAAC (International study of asthma and allergies in childhood) questionnaire among students enrolled in nine high-schools of Hawally Governorate of Kuwait. Prevalence of ETS exposure and self-reported asthma were computed. Multivariable log-binomial regression models were used to evaluate association between exposures of interest and self-reported asthma status.

**Results:** Of 800 invited students, 746 (92.2%) participated, of whom 74.8% were Kuwaiti and 50.1% were female with a mean (SD) age of 16.8 (0.68) years. ETS exposure prevalence at home was 54% and personal current smoking was 12.4%. Self-reported asthma prevalence was 20.5%. Furthermore, the prevalence of physician-diagnosed asthma, wheezing during the last 12 months and wheezing ‘ever’ was 16.4%, 20.1% and 26.2%, respectively. Final multivariable log-binomial regression model showed that compared to the adolescents without asthma, adolescents with self-reported asthma tended to be current smokers (adjusted prevalence ratio (adjusted PR) = 1.82; 95% CI: 1.30 – 2.56; \( p = 0.001 \)) or significantly more likely to have had ETS exposure at home (adjusted PR = 1.64; 95% CI: 1.21 – 2.23; \( p = 0.002 \)).

**Conclusions:** We recorded high prevalence of ETS exposure at home, high prevalence of self-reported asthma and identified ETS exposure at home and being a current smoker as strong risk factors for self-reported asthma among adolescents. Voluntary household smoking bans may substantially minimize the ETS exposure among adolescents. Additionally, such restriction may inculcate an antismoking attitude and prevent smoking initiation among adolescents. Such efforts are likely to pay dividends in terms of reduction in ETS exposure and associated asthma risk and other smoking-related morbidities in this and other similar settings.

**Background**

Asthma is one of the most important diseases of childhood, causing substantial morbidity [1], increases the hospital admission rates and primary care contacts [2]. Data from the ISAAC (International Study of Asthma and Allergies in Childhood) Phase-III study have shown an estimated global asthma prevalence among adolescents as 14.1% with an average annual increase of 0.28% from previous estimate during ISAAC Phase II study [3]. Furthermore, the results of ISAAC Phase -III study showed that virtually all the countries reported increases in the lifetime asthma prevalence between phases I and III. Globally, a wide variability (range: 2.1% - 32.2%) in the asthma prevalence has been recorded, not only between the regions and countries but also within the same country suggesting a crucial role of local environmental
characteristics [4]. This prevalence of asthma was particularly high in English speaking countries and Latin America [5]. Also, the highest 12-month prevalence of asthma was recorded in the UK, Australia, New Zealand, and Republic of Ireland, followed by North, Central, and South America; the lowest prevalence was reported from several Eastern European countries, Indonesia, Greece, China, Taiwan, Uzbekistan, India, and Ethiopia [6]. In Saudi Arabia, lately a ISAAC study reported the prevalence of physician-diagnosed asthma among adolescents as 19.6% [7]. In Kuwait, among 13-14 years adolescents, the estimated physician-diagnosed prevalence of asthma in ISAAC Phase I (16.8%) [8], and ISAAC III (15.6%) [9], almost remained unchanged. However, little published data on the recent status of asthma among adolescents in the Middle-Eastern countries including Kuwait are available.

There is a considerable evidence that exposure to environmental tobacco smoke (ETS) among children and adolescents has several ill-health consequences including an elevated risk of sudden infant death syndrome, reduced lung growth, early development of cardiovascular diseases, atopic dermatitis, increased susceptibility to respiratory infection and childhood asthma onset [10]. The effect of exposure to ETS on respiratory health has been of interest for many years [11]. The available epidemiological evidence on the relationship between ETS exposure and childhood asthma is largely based on the studies carried out in Western countries [12]. Little published data on the link between ETS exposure at home and asthma among adolescents are available from the Middle Eastern countries. In Kuwaiti population, tobacco consumption is practiced by different modes including cigarettes (34.4%), waterpipe (63.0%), both cigarettes and waterpipe (7.9%) [13]. Furthermore, smoking is much more common among men (32.4%) than women (1.5%) [13]. It is estimated that one-third of the Kuwaiti population are smokers [14], and 54% of the adolescents get exposed to ETS at homes [15]. Another recent study from Kuwait reported high prevalence of ETS exposure at home among the students enrolled in the middle schools (45.8%) and the high schools (51.6%) [16]. To decrease ETS exposure in Kuwait, the public health authorities regularly conduct educational campaigns through electronic print media and has banned the use of tobacco products in public places, such as malls, public offices, public gardens, etc. However, the impact evaluation of such efforts on the burden of allergic conditions including asthma among children through ETS exposure is still awaited. Therefore, the objectives of this cross-sectional study were to assess i) the prevalence of self-reported asthma, and ii) examine the association between ETS exposure and self-reported asthma among adolescents enrolled in various high schools in Kuwait.

**Methods**

**Population, setting and study design**

The study population, setting and design have been previously described elsewhere [17], and briefly outlined here. During October 2015, we conducted a cross-sectional study among high-school students in Hawally - one of the six Governorates of Kuwait to i) assess the prevalence of ETS exposure at home, ii) assess the prevalence of various allergic conditions including asthma and iii) evaluate the association between ETS exposure at home and self-reported asthma. The main consideration in choosing this population was their known high frequency and period of exposure to ETS and expected high prevalence
of asthma and other allergic conditions. From the Ministry of Education's website, we obtained a list of schools located in Hawally Governorate. From this list of 10 schools for boys, 9 schools for girls and 44 private schools with co-education system, nine schools were selected as a sample of convenience, which included three public sector schools each for male and female students and three private schools with co-education [17].

**Questionnaire**

For collection of the data on socio-demographic variables, smoking status, and exposure to tobacco smoke at home and in public areas, a structured and self-administered questionnaire was developed in English. For the diagnosis of asthma, the standardized International study of asthma and allergies in childhood (ISAAC) core questionnaire was used [18]. In this study, a respondent was regarded as an asthmatic, if during the past 12 months, he or she reported to have had four or more episodes of wheezing or one or more episodes of wheezing with the use of an inhaler (*i.e.* self-reported asthma) [18]. We also asked whether the respondent was ever diagnosed as asthmatic by a physician (physician-diagnosed asthma). As noted, in this study, self-reported asthma was defined based on ISAAC criteria [18], and used as an outcome variable for risk factors analysis. The questionnaire was developed in English and the final version was also translated in Arabic for actual use. The questionnaire was pre-tested on 20 students alike our potential study participants and modifications were made as needed. The questionnaire comprised 21 questions and took on average five minutes for its completion [17].

**Data collection**

From each of the selected schools, we intended to include about 100 students from various sections of 11th and 12th grade. For this purpose, we requested the respective section in-charge teachers in getting the questionnaire filled-in by the students at the end of the class. The teachers explained the study objectives to the students and they were further informed that their participation in the study is voluntary. We used the same data collection procedure both for private and public-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 with asthma in study population assuming the proportion of asthmatic participants in ETS unexposed group as 0.04 at a significance (α) level of 0.05. To accommodate any potential refusals, sample size was inflated as 450 students in each of the study group. The study protocol was approved by Kuwait University, Health Sciences Center's Ethics Committee for Students Research.

**Statistical analysis**

For the descriptive analysis, mean (standard deviation (SD)) for quantitative variables and frequencies (%) for categorical variables were computed. The chi-square test was used to test the statistical significance of association of each of the independent variable with self-reported asthma status as defined based on ISAAC criteria [18]. Since, odd ratio overestimates the association of predictors with common outcomes we used the PR both crude and adjusted as a measure of association between the independent variables and
self-reported asthma status. Univariable log-binomial regression model was used to quantify the magnitude of unadjusted association of each the categorical variables with self-reported asthma status. The variables significantly ($p \leq 0.150$) related with self-reported asthma status on univariable analysis were considered for inclusion in multivariable log-binomial regression model. Log-binomial regression analysis was performed to select the variables which were independently and significantly ($p < 0.05$) related to self-reported asthma status. Furthermore, regardless of the statistical significance, age, gender and total family income (Kuwaiti Dinars/ month) were included in the model to adjust for their confounding effects. Adjusted PRs and their 95% confidence intervals (CI) were used to interpret the final model.

**Results**

*Descriptive statistics, prevalence of asthma*

Of 800 high school students from 9 schools invited to participate in the study, 746 (93.3%) consented and completed the modified version of the ISAAC questionnaire. The selected schools included 3 public schools for boys, 3 public schools for girls and 3 private schools which have co-education comprising both male and female students. Non-respondents’ age and gender distributions were almost similar to those of the respondents. The mean (SD) age of the participants was 16.78 (0.68) years. The majority (74.8%) of the study participants were Kuwaiti, female (50.1%), and 56.1% of the adolescents came from the families having a total monthly family income more than 1000 Kuwaiti Dinars ($\approx 3210$ US $). Of the respondents, 91 (12.4%) were current regular smokers, substantially more among males (22.1%) than females (2.7%). Of the smokers, 55 (62%) have been smoking for more than 2 years. Of the study participants, 398 (54%) had ETS exposure at home (*i.e.* had one or more smokers at home). Moreover, 52.3% of the participants reported to have had ETS exposure for three or more hours a week at public places. The prevalence of self-reported asthma in this study sample was 20.5%. Additionally, the prevalence of physician-diagnosed asthma, wheezing during last 12 months and wheezing ‘ever’ was 16.4%, 20.1% and 26.2%, respectively (Table 1).
Table 1. Socio-demographic characteristics, cigarette smoking status and exposure to environmental tobacco smoke at home and prevalence of self-reported asthma* among participants. October 2015 (N = 746)

| Characteristics                                      | n   | %   |
|------------------------------------------------------|-----|-----|
| **Type of school**                                    |     |     |
| Government                                           | 594 | 79.0|
| Private                                              | 157 | 21.0|
| **Age, mean (SD)**                                   | 16.78 (0.68) | |
| **Gender**                                            |     |     |
| Male                                                 | 372 | 49.9|
| Female                                               | 374 | 50.1|
| **Nationality**                                      |     |     |
| Kuwaiti                                              | 552 | 74.8|
| Non-Kuwaiti                                          | 186 | 25.2|
| **Income (Kuwaiti Dinars)**                          |     |     |
| < 500                                                | 32  | 4.7 |
| 500-1000                                             | 126 | 18.3|
| 1001-1500                                            | 144 | 20.9|
| 1501-2000                                            | 105 | 15.3|
| > 2000                                               | 281 | 40.8|
| **Respondent smoking status**                        |     |     |
| (cigarettes per day)                                 | 643 | 87.6|
| None                                                 | 45  | 6.1 |
| Less than 10                                         | 46  | 6.3 |
| 10 or More                                           |     |     |
| **Smoking duration**                                 |     |     |
| < 1 year                                             | 13  | 14.6|
| Between 1-2 years                                    | 21  | 23.6|
| > 2 years                                            | 55  | 61.8|
| **Smokers at home**                                  |     |     |
| None                                                 | 338 | 45.9|
| One or more                                          | 398 | 54.1|
| **ETS exposure at public places**                    |     |     |
| (hours per week)                                     |     |     |
| < 3                                                  | 336 | 47.7|
| 3 to 6                                               | 205 | 29.1|
| 6 to 9                                               | 75  | 10.6|
| > 9                                                  | 89  | 12.6|
| **Wheezing ever**                                    |     |     |
| Yes                                                  | 197 | 26.2|
| No                                                   | 554 | 73.8|
| **Wheezing in the last 12 months**                   |     |     |
| Yes                                                  | 151 | 20.1|
| No                                                   | 600 | 79.9|
| **Physician-diagnosed asthma**                       |     |     |
| Yes                                                  | 123 | 16.4|
| No                                                   | 628 | 83.6|
| **Self-reported asthma status**                      |     |     |
| Yes                                                  | 154 | 20.5|
| No                                                   | 597 | 79.5|

* Diagnosed as per ISAAC criteria
### Table 2: Univariable analysis of adolescents’ characteristics associated with their self-reported asthma status in Kuwait: A cross-sectional study, October 2015 (n=746)

| Characteristics                          | Total n | Self-reported asthma* (yes vs. no) n (%) | Unadjusted prevalence ratio (95% CI) | p-value** |
|------------------------------------------|---------|------------------------------------------|--------------------------------------|-----------|
| **Gender**                              |         |                                          |                                      |           |
| Female                                   | 374     | 69 (18.4)                                | 1.00                                 | 0.163     |
| Male                                     | 372     | 85 (22.8)                                | 1.24 (0.93 – 1.64)                   |           |
| **Nationality**                          |         |                                          |                                      |           |
| Non-Kuwaiti                              | 186     | 37 (19.9)                                | 1.00                                 | 0.865     |
| Kuwaiti                                  | 552     | 115 (20.8)                               | 1.05 (0.76 – 1.47)                   |           |
| **Income (Kuwaiti Dinars)**              |         |                                          |                                      | 0.974***  |
| < 500                                    | 32      | 5 (15.6)                                 | 1.00                                 |           |
| 500-1000                                 | 126     | 28 (22.2)                                | 1.42 (0.60 – 3.39)                   |           |
| 1001-1500                                | 144     | 33 (22.9)                                | 1.38 (0.58 – 3.30)                   |           |
| 1501-2000                                | 105     | 19 (18.1)                                | 1.34 (0.54 – 3.33)                   |           |
| > 2000                                   | 281     | 64 (22.8)                                | 1.69 (0.73 – 3.92)                   |           |
| **Respondent’s current smoking status**  |         |                                          |                                      | < 0.001   |
| No                                       | 643     | 119 (18.5)                               | 1.00                                 |           |
| Yes                                      | 91      | 33 (36.3)                                | 1.96 (1.43 – 2.69)                   |           |
| **Number of smokers at home**            |         |                                          |                                      | < 0.001   |
| None                                     | 338     | 50 (14.8)                                | 1.00                                 |           |
| One or more                              | 398     | 103 (25.9)                               | 1.75 (1.29 – 2.37)                   |           |
| **ETS exposure at public places (hours per week)** | | | | 0.013 |
| < 3                                      | 336     | 58 (17.3)                                | 1.00                                 |           |
| ≥ 3                                      | 369     | 93 (25.2)                                | 1.46 (1.09 – 1.96)                   |           |

*On univariable analyses, the characteristics significantly associated with self-reported asthma status were adolescent’s current smoking status (PR = 1.96; CI: 1.43 – 2.69; p < 0.001), ETS exposure at home (presence of one or more smokers at home) (PR = 1.75; CI: 1.29 – 2.37; p < 0.001), and ETS exposure at public places (PR = 1.46; CI: 1.09 – 1.96; p = 0.013). Gender, nationality and monthly total family income (Kuwaiti dinars) were not significantly associated with self-reported asthma status in univariable analysis (Table 2). A multivariable log-binomial regression model showed that compared to adolescents without asthma, adolescents with asthma tended to be current smokers (adjusted PR = 1.82; 95% CI: 1.30 – 2.56; p = 0.001) or significantly more likely to have had ETS exposure at home (adjusted PR = 1.64; 95% CI: 1.21 – 2.23; p = 0.002) after adjusting for the effects of age, sex and total family monthly income (Table 3).*
ETS: Environmental Tobacco Smoke

*Diagnosed as per ISAAC criteria

** $p$-values are for Yate’s corrected Chi-squared statistic unless stated otherwise,

*** $p$-value for Chi-squared statistic for trend.

Table 3. Multivariable log-binomial regression model* of the variables associated with the respondent’s self-reported asthma status in Kuwait: A cross-sectional study, October 2015

| Variables                              | Self-reported asthma status (yes vs. no) ** |
|----------------------------------------|---------------------------------------------|
|                                        | Adjusted prevalence ratio (95% confidence interval) | $p$-value |
| Respondent current smoking status (yes vs. no) | 1.82 (1.30– 2.56)                     | 0.001     |
| Number of smokers at home (one or more vs. none) | 1.64 (1.21 – 2.23)                     | 0.002     |

* The model was adjusted for age, gender and total family income (Kuwaiti Dinars/ month)

** Diagnosed as per ISAAC criteria

Discussion

This cross-sectional study assessed the prevalence of self-reported asthma and examined ETS exposure, active tobacco smoking along with demographic, lifestyle and behavioural characteristics in relation to self-reported asthma status among adolescents in Hawalli Governorate, Kuwait. The prevalence estimates of self-reported asthma and physician-diagnosed asthma were (20.5%) and (16.4%) respectively. The prevalence estimates for self-reported asthma is higher than the figures reported by earlier ISAAC studies conducted in Kuwait during 1995-1996 (16.8%) [8], and 2001-2002 (15.6%) [9]. The estimate of self-reported asthma in this study is also greater than an estimate (14.6%) reported in a recent study among university students in Kuwait [15]. In contrast, the prevalence estimate of physician-diagnosed asthma (16.4%) in this study is largely in agreement with the estimates from the 1995-1996 (16.8%) and 2001-2002 (15.6%) ISAAC studies in Kuwait [8, 9]. Additionally, prevalence estimate (20.5%) of self-reported asthma among high school students in this study was fairly comparable with the estimates reported among high-school students in Saudi Arabia (18.5%) [19], Lebanon (19.5%) [12], Virginia, USA (16%) [20], Lima, Peru (16.7%) [21], and much higher than a prevalence (10.7%) estimated among 6-15 years old 23,044 Japanese students based on ISAAC criteria [22]. Across Latin American countries, a wide variation in one-year prevalence of self-reported asthma diagnosed based on ISAAC criteria was recorded, which ranged from 6-28% among adolescents (13-14 years) and 7-27% among children (6-7 years) [23], with some countries registered higher estimates than the one in the present study. Furthermore, in the present study, 12-month prevalence of wheezing was 20.1%, which is higher than the 12-month prevalence
estimates reported in earlier ISAAC studies conducted in Kuwait during 1995-1996 (16.1%) [8], and 2001-2002 (7.6%) [9]. Additionally, the 12-month prevalence of wheezing in the current study is also higher than the global estimate of 14.8% among adolescents aged 13-14 years [24]. Evaluation of worldwide trends in the prevalence of asthma symptoms based on ISAAC Phase III study has shown that while there was little change in the overall prevalence of current wheeze, the proportions of the children reported to have had asthma increased significantly, possibly reflecting greater awareness of this condition and/or changes in diagnostic practice. However, it was recognized that the increases in asthma symptoms prevalence in Africa, Latin America and parts of Asia indicate that the global burden of asthma is continuing to rise, but the global prevalence differences are lessening [25]. Hence with 20.5% prevalence estimate of self-reported asthma, Kuwait can be bracketed with the group of countries with high prevalence of self-reported asthma among adolescents. These differences in the self-reported asthma prevalence could possibly be due to varying distributions of underlying contributing factors such as populations’ genetics, dietary habits, microbial exposure, economic status, indoor or outdoor environment, climatic variation, and disease awareness [26, 27]. It has been argued that the global increases in asthma prevalence appear to include both allergic and non-allergic asthma which highlights the importance of considering the heterogeneity of asthma with different phenotypes having different pathophysiologic mechanisms [28]. Therefore, monitoring of adolescents’ respiratory disorders including asthma and identification of underlying factors in various geographical regions is warranted to alleviate the burden of asthma and related complications.

Multivariable log-binomial regression model showed that compared to non-smokers, current smoker adolescents were significantly more likely to be asthmatic. This finding is consistent with the reports from Britain [29], Argentina [30], South Korea [31, 32], wherein smoker adolescents reportedly were at greater risk for current self-reported asthma. Relatively a recent study also found 70% increased asthma risk among smoker than non-smokers young adults enrolled in a public sector university in Kuwait [15]. Thus, concerted efforts at high school-level to increase the awareness regarding deleterious effects of tobacco smoking may help in reducing tobacco consumption among adolescents.

Final multivariable log-binomial regression also revealed that the adolescents were significantly more likely to be asthmatic, if they have had ETS exposure at home. This finding is in agreement with the results of earlier cross-sectional studies undertaken in various regions across the globe using ISAAC methodology [30, 33]. These reports showed that adolescents were more likely to develop asthma if either or both parents were smokers compared to non-smoking parents [11, 30, 33, 34]. Another cross-sectional study from Spain showed that parental smoking was associated with a higher prevalence of all forms of asthma in the adolescents population, particularly if mother or both parents smoked [35]. In Mexico, a case-control study showed adolescents with asthma nearly were twice as likely to report one or more smokers at home as those without asthma [36]. In Sweden, a longitudinal population-based cohort study of children recruited at birth and followed through childhood and adolescence demonstrated 68% significantly increased risk of asthma among children up to 16 years of age born to heavy (≥ 10 cigarettes /d) smoking compared to non-smoking mothers [37]. To demonstrate the consistency of relationship between tobacco and the asthma risk across the globe, Mitchell and colleagues analyzed the ISAAC programme Phase III data on the 6-7 year age group (220 407 children from 75 centres in 32 countries) and 13-14 year age
group (350 654 adolescents from 118 centres in 53 countries) and reported a significant association between current maternal smoking and current asthma symptoms. This association was held across all nine world regions covered by the study including Eastern Mediterranean region. Moreover the investigators showed a dose-response relationship between severe asthma symptoms and number of cigarettes smoked per day by both the parents [11]. Thus, cumulated anecdotal evidence on the link between ETS exposure and asthma risk among adolescents warned the causal relationship [37-39]. Furthermore, it has been argued that while significant advances in asthma treatment were made in the 20\textsuperscript{th} century, it is evident that in the 21\textsuperscript{st} century, asthma is likely to create a tremendous strain on a large population of socio-economically disadvantaged individuals with limited access to health care and resources [28]. Therefore, focused education to minimize the exposure to tobacco smoke through active or passive modes may alleviate the asthma burden in such populations.

There are some notable strengths of this study. First, the study sample comprised participants who were homogenous regarding age. Second, the use of sex-stratified sampling allowed enrollment of an almost equal number of male and female participants. Final, the use of the standardized and validated ISAAC questionnaire for the outcome assessment facilitated the comparison study results with that of other local, regional and international studies. Some limitations of this study should be considered while interpreting the results. First, this was a cross-sectional study and this design has inherent limitation in establishing temporal relationship between the studied exposures such as self-smoking status, ETS exposure at home and self-reported asthma. Second, past one-year data were collected using a self-administered questionnaire with chances of recall bias. However, one-year period presumably was not long enough to severely hamper the recall the events. Third, we estimated the asthma prevalence for the past 12 months and if the children grew out of asthma, which they might have early on in their life then such cases were likely to be missed out as asthmatic in this evaluation. This might have led somewhat underestimation of self-reported asthma prevalence. However, due to a chronic nature of the disease, the number of such adolescents is likely to be very small and indeed might have negligible influence on the study results. Fourth, we enrolled the adolescents in the study as a sample of convenience, therefore, generalizability of the results to the other adolescents in the country and beyond should be exercised with care. However, we do not have any reason to believe that the adolescents in the study were any different from those at large in the population. Additionally, though our sample was statistically non-representative but was typical of Kuwaiti adolescents in the population at large. Final, the responses on outcome questions were self-reported and were not validated by more objective measurements. However, the ISAAC questionnaire used in this evaluation has been validated in multiple languages in different countries including Kuwait [8, 9, 11].

**Conclusions**

We recorded high prevalence of ETS exposure at home, a high prevalence of self-reported asthma and identified ETS exposure at home and being a current smoker as strong risk factors for self-reported asthma status among adolescents. ETS exposure is currently only avoidable risk factor for which considerable evidence of an etiologic link with asthma among adolescents is available with population attributable risk
ranging from 2 to 20% depending upon the level of maternal and paternal smoking [11]. Therefore, voluntary household smoking bans may substantially minimize the ETS exposure among adolescents at home. Furthermore, such a restriction may inculcate an antismoking attitude and prevent smoking initiation among adolescents. Such efforts are likely to pay dividends in terms of reduction in ETS exposure and associated asthma risk and other smoking related morbidities in this and other similar settings as have been shown in other populations [35, 40].

Abbreviations
ETS: Environmental Tobacco Smoke; ISAAC: International Study of Asthma and Allergies in Childhood; SD: Standard Deviation; PR: Prevalence Ratio; CI: Confidence Interval

Declarations

Ethics approval and consent to participate
The study protocol was approved by Kuwait University, Health Sciences Center’s Ethics Committee for Students Research. All the participants provided written informed consent to participate in study before completing the questionnaire.

Consent to publish
Not applicable

Availability of data and materials
The data collected and analyzed are included in this manuscript and can be made available on reasonable request.

Competing interests
None declared.

Funding
This study did not receive any specific research grant from any source.

Authors’ contributions
SA conceptualize the study question and design. HB, MA, SAL. AB AA, OA participated questionnaire design, data collection, data analysis and preparing the first draft of the manuscript. SA reviewed and edited the draft manuscript. All authors read and approved the final manuscript.

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