

# Tobacco use among adolescents in Qatar: Findings from Global Youth Tobacco Surveys 2004–2013

Ayman Al-Dahshan<sup>1</sup>, Mohamad El Zoghbi<sup>2</sup>, Mohamad Abdul Halim Chehab<sup>1</sup>, Sarah Naja<sup>1</sup>, Nagah Abdel Aziz Selim<sup>3,4</sup>

## ABSTRACT

**INTRODUCTION** Tobacco use has become a global health concern. Almost a third of the adolescents of the Eastern Mediterranean Region (EMR) have reported tobacco use and the percentage is expected to rise in the future, making tobacco consumption a main public health issue among students, 13–15 years old, in the region's countries. We aimed to conduct an analysis of the previous Global Youth Tobacco Surveys (GYTS) in Qatar to detect any significant changes that might inform decision makers on planning policies and interventions accordingly.

**METHODS** This study presents a retrospective data analysis, based on three GYTS conducted in Qatar during 2004, 2007, and 2013. All analyses were weighted to account for the complex survey design and for differential non-response at school, class and student levels, with the exception of the analysis of sociodemographic characteristics. The differences between the proportions were tested by Pearson's chi-squared test. Data were analyzed using the statistical software SPSS (Statistical Package for Social Sciences), version 21.0 (Chicago, IL). A p-value <0.05 was considered to be significant.

**RESULTS** There was an overall increase in the prevalence of smoking, the accessibility, and the availability of cigarettes. Additionally, the percentage of participants who desired to stop smoking decreased between 2004 and 2013, while that of students who reported '*exposure to free tobacco promotion*' was highest in 2013.

**CONCLUSIONS** Despite the effort made by the local authorities in Qatar to reverse the spread or limit the growing tobacco epidemic, there is a need for multidisciplinary interventions through tobacco prevention and control programs targeting youths.

**ABBREVIATIONS** EMR: Eastern Mediterranean Region, GYTS: Global Youth Tobacco Survey, GCC: Gulf Cooperation Council

## AFFILIATION

**1** Community Medicine Residency Program, Hamad Medical Corporation, Doha, Qatar

**2** Quality Management Department, Primary Health Care Corporation, Doha, Qatar

**3** Public Health and Preventive Medicine, Faculty of Medicine, Cairo University, Cairo, Egypt

**4** Community Medicine Residency Program, Primary Health Care Corporation, Doha, Qatar

## CORRESPONDENCE TO

Mohamad El Zoghbi. Quality Management Department Primary Health Care Corporation, PO Box 26555, Doha, Qatar.  
E-mail: zoghbi2001@hotmail.com

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## INTRODUCTION

Tobacco use has become a global health concern and afflicts developed as well as developing countries<sup>1</sup>. Today, the majority of the world's one billion tobacco consumers are located in developing countries<sup>2</sup>. Moreover, most of the world's current smokers initiated the habit during their adolescence. Similarly, the duration of tobacco use has been inversely associated with the age of initiation<sup>3</sup>. Globally, the number of adolescent boys and girls, who smoke cigarettes, has been estimated at 25 million and 13 million, respectively<sup>4</sup>. This deadly habit has become a

pandemic responsible for six million deaths annually<sup>5</sup>. In the EMR, the prevalence of tobacco use is underestimated due to several factors, including lack of data from some countries, underreporting by females, and the presence of unaccounted methods of tobacco consumption (e.g. water-pipe)<sup>6</sup>. In addition, a report on the trend in adolescent tobacco use in EMR countries between 1999 and 2007 revealed tobacco consumption as a main public health issue among students 13–15 years old<sup>7</sup>. Moreover, almost a third of the region's adolescents have reported tobacco use and the percentage is expected to rise in the future<sup>8</sup>.

Earlier research has shown that tobacco use among relatives, peer pressure, and parent-child relationships play an important role in smoking behavior among adolescents<sup>9</sup>. On the other hand, several strategies have proven effective in preventing the spread of tobacco use among adolescents, such as school-based interventions as well as targeted primary health care services<sup>10,11</sup>.

The Global Youth Tobacco Survey (GYTS) was established in 1998 to monitor tobacco consumption among the youth as well as guide the implementation and evaluation of prevention and control programs<sup>12</sup>. A separate review, involving the GYTS conducted in the Gulf Cooperation Council (GCC) countries, found a high prevalence of tobacco consumption, considerable exposure (30%) to passive smoke in public areas, and an increased vulnerability of non-smokers to start smoking in the next academic year<sup>13</sup>.

Qatar developed its first tobacco-related legislation in 2002 and signed the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) in 2004<sup>14</sup>. However, the country was one of the nations with the highest prevalence (30.2%) of tobacco use among adolescents based on a study of the Global School-based Student Health Surveys from 68 low- and middle-income countries<sup>15</sup>. Nevertheless, Qatar's constitution encompasses multiple well-established laws and decrees that govern the importation, advertising, vending, and use of tobacco and its derivatives<sup>16</sup>. As of 2018, the State of Qatar had participated three times in the GYTS in 2004, 2007 and 2013.

Thus, we aimed to analyze the datasets of the three GYTS to study the changes in tobacco use among adolescents in Qatar that might inform decision makers on planning policies as well as interventions accordingly.

## METHODS

### Study design, sampling and data collection

The current paper presents a retrospective data analysis using cross-sectional surveys based on the three GYTS, which are self-administered, anonymous and voluntary surveys<sup>17</sup>. In Qatar, the Ministry of Public Health and the Ministry of Education conducted the GYTS during 2004, 2007 and 2013. The surveys aimed to evaluate the smoking habits and

beliefs among Qatar's Middle school students aged between 13 and 15 years.

The samples taken were nationally representative. The sampling frame encompassed all schools that include the grades associated with the ages between 13 and 15 years. The surveys were carried out among a sample of the target population using a two-stage cluster sample design. During the first stage, schools were selected proportionally according to enrollment size. In the second stage, classes were randomly selected within participating schools and all students present in the selected classes on the day of the survey administration were eligible to participate. Therefore, the samples taken were nationally representative and had a high response rate. The first survey conducted in 2004 was among grades eight to ten, while the following surveys of 2007 and 2013 were among grades seven to nine<sup>12,18,19</sup>.

The three datasets, including the questions and results, are available through the Centers for Disease Control and Prevention (CDC) website<sup>17</sup>.

### Statistical analysis

The three versions of the GYTS that were used to collect data in 2004, 2007 and 2013 included a different number of questions (56, 71 and 78 respectively). The three surveys had 25 similar questions related to the study objective (in addition to the three sociodemographic questions), while the other questions were different. In addition, the answers to some questions included in the current study were not exactly the same, and therefore we recoded them.

Our analyses exclusively included students aged between 13 and 15 years. In each data set and for each student record, a weighting factor was applied for non-response adjustment (by school, class and student) and for the variation in the probability of selecting a school and a class. The final adjustment included calculating the average weight by sex and grade for each sample site. The weighting factor calculation was described previously in detail<sup>12,18-20</sup>.

We used the weighting factor to conduct our statistical analyses, with the exception of the analysis of the sociodemographic characteristics. The differences between the proportions were tested by Pearson's chi-squared test. The statistical software SPSS (Statistical Package for Social Sciences),

version 21.0 (Chicago, IL) was used to analyze the data. A p-value less than 0.05 was considered statistically significant.

**RESULTS**

Overall, 2229, 943 and 1716 students aged between 13 and 15 years old participated in the 2004, 2007 and 2013 surveys, respectively (Table 1).

The weighted percentage (24.8%) of ever cigarette smokers among participants of the 2013 survey is significantly higher than that observed in the 2004 and 2007 surveys (22.4% and 20.7%, respectively;  $p < 0.001$ ). The percentage of current smokers among the 2013 survey participants (9.8%; 7.1% non-frequent smokers and 2.7% frequent smokers) is significantly higher than that observed in 2004 (6.4%; 4.5% non-frequent smokers and 1.9% frequent smokers) and in 2007 (6.5%; 5.8% non-frequent smokers and 0.7% frequent smokers). Regarding the signs of smoking dependence, the weighted percentages of those who reported to *‘have a cigarette or feel like having a cigarette first thing in the morning’* among the current smokers decreased gradually from 38.9% in 2004, to 35.8% in 2007, and 25.3% in 2013 ( $p < 0.001$ ). Moreover, the percentage of those

*Table 1. Main characteristics of the Surveys’ participants*

|                           | 2004<br>(N=2229)<br>n (%) | 2007<br>(N=943)<br>n (%) | 2013<br>(N=1716)<br>n (%) | p <sup>a</sup> |
|---------------------------|---------------------------|--------------------------|---------------------------|----------------|
| <b>Gender</b>             |                           |                          |                           |                |
| Boys                      | 1009 (45.6)               | 362 (40.7)               | 893 (52.5)                | <0.001         |
| Girls                     | 1203 (54.4)               | 527 (59.3)               | 807 (47.5)                |                |
| <b>Age (Years)</b>        |                           |                          |                           |                |
| 13                        | 638 (28.6)                | 382 (40.5)               | 667 (38.9)                | <0.001         |
| 14                        | 885 (39.7)                | 329 (34.9)               | 639 (37.2)                |                |
| 15                        | 706 (31.7)                | 232 (24.6)               | 410 (23.9)                |                |
| <b>School Grade level</b> |                           |                          |                           |                |
| 7                         | 0 (0.0)                   | 327 (36.7)               | 438 (26.0)                | NA             |
| 8                         | 921 (41.7)                | 273 (30.6)               | 603 (35.8)                |                |
| 9                         | 787 (35.7)                | 292 (32.7)               | 645 (38.3)                |                |
| 10                        | 498 (22.6)                | 0 (0.0)                  | 0 (0.0)                   |                |

a Pearson's chi-squared test. NA: not appropriate.

smoking other products declined by almost half in 2013 (7.0%) compared to that in 2004 (13.7%) and 2007 (12.8%;  $p < 0.001$ ) (Table 2).

Among smokers in the three surveys, the weighted percentage of participants who desired to stop smoking was significantly higher during 2004 and

*Table 2. Cigarette smoking details among the participants of the three Surveys (2004, 2007 and 2013)*

|  | 2004<br>n <sub>w</sub> (% <sub>w</sub> ) | 2007<br>n <sub>w</sub> (% <sub>w</sub> ) | 2013<br>n <sub>w</sub> (% <sub>w</sub> ) | p <sup>a</sup> |
|--|--|--|--|----------------|
| <b>Ever cigarette smokers</b>  |  |  |  |                |
| Yes  | 2774 (22.4)                              | 1622 (20.7)                              | 4035 (24.8)                              | <0.001         |
| <b>Current cigarette smokers</b>   |  |  |  |                |
| Current smokers  | 775 (6.4)                                | 509 (6.5)                                | 1576 (9.8)                               | <0.001         |
| <b>Age (years) at cigarette smoking initiation<sup>b</sup></b>                                 |  |  |  |                |
| <12  | 1012 (47.4)                              | 556 (47.0)                               | 1708 (47.8)                              | 0.884          |
| ≥12  | 1121 (52.6)                              | 628 (53.0)                               | 1867 (52.2)                              |                |
| <b>Frequency of cigarette smoking<sup>b</sup></b>  |  |  |  |                |
| Non-frequent <sup>c</sup>  | 543 (70.1)                               | 454 (89.2)                               | 1143 (72.5)                              | <0.001         |
| Frequent <sup>d</sup>  | 232 (29.9)                               | 55 (10.8)                                | 433 (27.5)                               |                |
| <b>Number of cigarettes smoked per day during the past 30 days<sup>b</sup></b>                 |  |  |  |                |
| 0–10   | 721 (83.4)                               | 532 (96.9)                               | 1487 (88.9)                              | <0.001         |
| >10  | 144 (16.6)                               | 17 (3.1)                                 | 186 (11.1)                               |                |
| <b>Have a cigarette or feel like having a cigarette first thing in the morning<sup>b</sup></b> |  |  |  |                |
| Yes  | 222 (38.9)                               | 116 (35.8)                               | 1032 (25.3)                              | <0.001         |
| <b>Current smokers of other products</b>   |  |  |  |                |
| Yes  | 1678 (13.7)                              | 1015 (12.8)                              | 1129 (7.0)                               | <0.001         |

n<sub>w</sub>: weighted frequency; %<sub>w</sub>: weighted percentage. a Pearson's chi-squared test. b Among smokers only (excluding "did not smoke"). c Non-frequent cigarette smokers: respondents who smoked cigarettes on less than 20 days of the past 30 days. d Frequent cigarette smokers: respondents who smoked cigarettes on 20 or more days of the past 30 days.

2007 (53.9% and 59.6%, respectively) than in 2013 (43.9%;  $p < 0.001$ ) (Table 3).

The weighted percentage of participants who agreed with ‘*Banning smoking in enclosed public places*’ declined from a majority of 84.8% and 81.3% in 2004 and 2007, respectively, to less than half (48.3%) in 2013. Regarding passive smoking, the

weighted percentage of participants exposed to secondhand smoke decreased from almost a third (30.2%) in 2004 to a quarter (24.2%) in 2013, despite a rise of 35.7% in 2007 ( $p < 0.001$ ) (Table 4).

Among those who attended sports or community events, less than half (45.2%) reported ‘*awareness of anti-tobacco messages*’ in 2013, which represents

**Table 3. Accessibility and availability of cigarettes and smoking cessation details among the participants of the three Surveys (2004, 2007 and 2013)**

|  | 2004<br>$n_w$ (%) | 2007<br>$n_w$ (%) | 2013<br>$n_w$ (%) | $P^a$  |
|--|-------------------|-------------------|-------------------|--------|
| <b>Source of cigarettes<sup>b</sup></b>                          |                   |                   |                   |        |
| Store, shop, street vendor, cafeteria or kiosk                   | 456 (40.2)        | 196 (30.0)        | 1664 (66.1)       | <0.001 |
| Someone else   | 314 (27.7)        | 235 (36.0)        | 437 (17.3)        |        |
| Other  | 365 (32.2)        | 222 (34.0)        | 418 (16.6)        |        |
| <b>Minors' access to purchasing cigarettes<sup>b</sup></b>       |                   |                   |                   |        |
| Yes, someone refused to sell me cigarettes because of my age     | 446 (45.5)        | 277 (42.5)        | 990 (50.1)        | 0.001  |
| No, my age did not keep me from buying cigarettes                | 535 (54.5)        | 374 (57.5)        | 988 (49.9)        |        |
| <b>Desire to stop smoking<sup>b</sup></b>                        |                   |                   |                   |        |
| Yes  | 523 (53.9)        | 434 (59.6)        | 845 (43.9)        | <0.001 |
| <b>Attempt to stop smoking in the past 12 months<sup>b</sup></b> |                   |                   |                   |        |
| Yes  | 580 (54.4)        | 314 (53.6)        | 1206 (56.9)       | 0.212  |
| <b>Ability to stop smoking<sup>b</sup></b>                       |                   |                   |                   |        |
| Yes  | 896 (69.5)        | 575 (78.2)        | 1434 (66.6)       | <0.001 |
| <b>Received help to stop smoking<sup>b</sup></b>                 |                   |                   |                   |        |
| Yes  | 1766 (76.9)       | 1134 (86.2)       | 2440 (70.5)       | <0.001 |

$n_w$ : weighted frequency; % $_w$ : weighted percentage. a Pearson's chi-squared test. b Among smokers only (excluding "did not smoke").

**Table 4. Knowledge and attitudes related to cigarette smoking and secondhand smoking among the participants of the three Surveys (2004, 2007 and 2013)**

|   | 2004<br>$n_w$ (%) | 2007<br>$n_w$ (%) | 2013<br>$n_w$ (%) | $P^a$  |
|---|-------------------|-------------------|-------------------|--------|
| <b>Beliefs about the addictiveness of smoking</b>                             |                   |                   |                   |        |
| Yes   | 6973 (56.6)       | 4486 (55.9)       | 9163 (56.3)       | 0.582  |
| <b>Beliefs about the dangers of secondhand smoke</b>                          |                   |                   |                   |        |
| Yes   | 10985 (88.7)      | 6596 (82.1)       | 12645 (76.9)      | <0.001 |
| <b>Belief that smoking helps people feel comfortable at social gatherings</b> |                   |                   |                   |        |
| More comfortable  | 2145 (17.5)       | 1322 (16.7)       | 3403 (22.0)       | <0.001 |
| Less comfortable  | 5734 (46.8)       | 5332 (67.5)       | 5974 (38.7)       |        |
| No difference from non-smokers  | 4368 (35.7)       | 1240 (15.7)       | 6063 (39.3)       |        |
| <b>Agree with banning smoking in public places</b>                            |                   |                   |                   |        |
| Yes   | 10499 (84.8)      | 6335 (81.3)       | 7976 (48.3)       | <0.001 |
| <b>Exposure to secondhand smoke at home</b>                                   |                   |                   |                   |        |
| Yes   | 3750 (30.2)       | 2848 (35.7)       | 4044 (24.2)       | <0.001 |
| <b>Exposure to secondhand smoke in enclosed public places</b>                 |                   |                   |                   |        |
| Yes   | 5824 (46.8)       | 3688 (45.9)       | 7981 (47.9)       | 0.010  |

$n_w$ : weighted frequency; % $_w$ : weighted percentage. a Pearson's chi-squared test.

Table 5. The awareness of anti-tobacco and pro-tobacco messages among the participants of the three Surveys (2004, 2007 and 2013)

|   | 2004<br>$n_w$ (% $_w$ ) | 2007<br>$n_w$ (% $_w$ ) | 2013<br>$n_w$ (% $_w$ ) | $p^a$  |
|---|-------------------------|-------------------------|-------------------------|--------|
| Awareness of anti-tobacco messages in the media                                 |                         |                         |                         |        |
| Yes   | 7984 (64.4)             | 5328 (68.4)             | 8347 (52.9)             | <0.001 |
| Awareness of anti-tobacco messages at sporting or community events <sup>b</sup> |                         |                         |                         |        |
| Yes   | 8549 (88.1)             | 5741 (90.1)             | 4131 (45.2)             | <0.001 |
| Learning about dangers of tobacco use at school                                 |                         |                         |                         |        |
| Yes   | 2303 (18.7)             | 3928 (49.7)             | 7507 (47.2)             |        |
| No  | 7470 (60.5)             | 2257 (28.6)             | 6843 (43.0)             | <0.001 |
| I don't know  | 2570 (20.8)             | 1715 (21.7)             | 1548 (9.7)              |        |
| Awareness of tobacco use on television, videos, or movies <sup>c</sup>          |                         |                         |                         |        |
| Yes   | 11118 (95.4)            | 7123 (94.5)             | 8455 (63.5)             | <0.001 |
| Ownership of an object with a tobacco brand logo                                |                         |                         |                         |        |
| Yes   | 1239 (10.2)             | 1241 (16.8)             | 2453 (16.2)             | <0.001 |
| Exposure to free tobacco promotion  |                         |                         |                         |        |
| Yes   | 1082 (8.9)              | 605 (8.0)               | 1712 (11.0)             | <0.001 |

$n_w$ : weighted frequency; % $_w$ : weighted percentage. a Pearson's chi-squared test. b Excluding: "I did not go to sports events, fairs, concerts, or community events, or social gatherings in the past 30 days". c Excluding: "I did not watch TV, videos, or movies in the past 30 days".

a significant drop from the percentages in the 2004 and 2007 surveys (88.1% and 90.1%, respectively;  $p < 0.001$ ). Further, the lowest percentage of participants who reported 'learning about dangers of tobacco use at school' was observed in 2004 (18.7%), compared to those in 2007 (49.7%) and 2013 (47.2%) ( $p < 0.001$ ) (Table 5).

## DISCUSSION

To our knowledge, this is the first study comparing the findings of the three GYTS conducted in the State of Qatar during the years of 2004, 2007 and 2013. The main findings in this paper demonstrate that between 2004 and 2013, there was an overall increase in the prevalence of smoking, a decline in the role of media in promoting pro-tobacco and anti-tobacco messages, a drop in secondhand smoke exposure at home, a rise in smoking prevalence in enclosed public spaces, and a decrease in smoking cessation. The findings were unexpected because Qatar's National Health Strategy (2011–2016) had adopted a project (Project 3.3), which draws on the WHO MPOWER themes. The MPOWER is a set of six components for tobacco control and include the following: Monitor tobacco use and prevention policies; Protect people from tobacco smoke; Offer help to quit tobacco use;

Warn about the dangers of tobacco; Enforce bans on tobacco advertising, promotion and sponsorship; and Raise taxes on tobacco. Thus, Project 3.3 'Tobacco Cessation' aimed to decrease the current consumption of tobacco by 3 % through the enhancement of tobacco cessation and awareness strategies, such as increasing the accessibility to smoking cessation clinics and reviewing national laws to increase taxation on tobacco products. Moreover, the project aims at strengthening the prevention of smoking among young people and expanding the smoke-free environments<sup>21,22</sup>.

The unforeseen trend of smoking among school going adolescents in Qatar could be linked to several factors seen in our analysis: 1) a decreased desire among adolescents to quit smoking, 2) the deficiency of smoking cessation services offered to adolescents in the country, and 3) an unwanted yet increased accessibility to tobacco products for adolescents, especially in the shops and cafeterias that offer tobacco. Although there is an increased resistance among merchants regarding not selling tobacco to minors, the prevalence of smokers in that age group was not affected significantly.

The increased proportion (by 2%) of smokers among the adolescent age group in Qatar from 2004

to 2013 is less than the dramatic increase seen in other countries such as Timor-Leste in Portugal, where the percentage of minor smokers (aged 13–15 years) rose by 19% between 2006 and 2009<sup>23</sup>. On the other hand, the GYTS in Panama showed a decrease in the percentage of current cigarette smoking, among those aged 13–15 years, from 13.2% to 4.3% between 2002 and 2008<sup>24</sup>. As for GCC countries, a limited number of studies evaluated the trend of youth smoking over time. Similarly, the three GYTS conducted in Saudi Arabia revealed an unspecific pattern in smoking over the years, where the prevalence of ever smokers (aged 15–18 years) was 34.5% in 2001 that decreased to 27% in 2007 but then suddenly increased to 42.8% in 2010<sup>25</sup>. On the other hand, a cross-sectional study conducted in the United Arab Emirates during 2015 identified a considerable proportion (39%) of secondary school boys (76.2% were aged 15–17 years) as ever smokers, which is higher than that in Qatar (24.8%)<sup>26</sup>.

Despite the fact that the age distribution among participants differed significantly between the three Surveys in Qatar ( $p < 0.001$ ), the age of smoking initiation showed no significant difference over the years. Furthermore, the percentage of participants aged 13 years increased from 28.6% in 2004, to 40.5% in 2007, and 38.9% in 2013. On the other hand, the proportion of respondents aged 15 years decreased from 31.7% in 2004, to 24.6% in 2007, and 23.9% in 2013. In contrast, findings from 68 low- and middle-income countries showed that adolescents aged 14–15 years were more likely to smoke than those aged 12–13 years<sup>15</sup>.

Another major finding is the emboldened disbelief among school students regarding the harm of tobacco, which reached its peak in 2013 when almost a quarter (23.1%) of the participants, up from 17.9% in 2007, denied the harmful effects of tobacco use. Furthermore, smoking has become more socially acceptable, especially during gatherings. Similarly, almost half (52%) of the respondents in 2013 rejected the idea of banning tobacco use in enclosed public spaces. In addition, the aforementioned response revealed almost a triple increase compared to that of 2004 (15%) and 2007 (19%). Such findings could be explained by the increase in free tobacco promotion coupled with

the significant decrease in the advertisement of anti-tobacco awareness messages in media, television, videos, movies, sports and community events from 2004 to 2013. Similarly, a previous study conducted among nationally representative samples of school students aged 13–15 years in GCC countries and Yemen showed that direct pro-tobacco advertising exposure was more than 70% in newspapers and on billboards<sup>13</sup>.

Furthermore, the analysis of the three GYTS surveys showed that there is an increasing trend in school education on the hazards of tobacco use by almost 28% from 2004 (18.7%) to 2013 (47.2%). Despite the fact that schools amplified the promotion of anti-tobacco health education, there was no change in the smoking beliefs and behavior among students. This finding indicates that a multidisciplinary approach involving the media, community and legislative authorities is needed in addition to health-promoting initiatives at the school level. Moreover, a study encompassing GYTS data from 43 countries conveyed that an increased awareness about the harm of tobacco among students was associated with the presence of tobacco prevention courses in their respective schools<sup>27</sup>. In addition, a review by Backinger et al.<sup>28</sup> revealed that school curricula alone are ineffective in preventing youth smoking, unless coupled with other methods such as smoke-free policies<sup>28</sup>.

Our analysis also revealed an overall decrease in exposure to secondhand smoking at home and an increase in enclosed public spaces. The observed decline might indicate an increase in the level of awareness among the youth's family members; however, such issues need further assessment and control. Similarly, a study by Al-Zalabani et al.<sup>29</sup> involving 3210 intermediate and secondary school students in Madinah, Saudi Arabia, showed that approximately one-third (32.7%) were exposed to secondhand smoke at home. In addition to several health consequences of exposure, secondhand tobacco smoke is also known to be a predictor of future smoking initiation among the young especially if exposed at home<sup>30</sup>. Furthermore, Lessov-Schlaggar et al.<sup>31</sup> identified sensitivity to secondhand smoke exposure among children 8–13 years old as one factor that heightens smoking susceptibility later in life<sup>31</sup>.

## Limitations

Some limitations should be considered when discussing the findings of this report. The use of a school-based survey might not be representative of all youths, especially those who dropped out of school. In addition, the data retrieved in the GYTS are based on self-reporting by students, who in turn might be prone to non-response bias resulting in over- or under-estimation of the actual results. Another limitation of the study was that the data collected over the three years was cross-sectional and reflected different populations. As for the strengths, the study represents the first in Qatar where a weighting methodology was used to adjust for non-response.

## CONCLUSIONS

Despite efforts made by the local authorities in Qatar to reverse the spread or limit the growing tobacco epidemic, there is still a need for multidisciplinary strategies to promote and enforce smoke-free policies vital to tobacco prevention and control programs targeting youths. In addition, the study findings provide information to help develop an adolescent-specific national tobacco control program, which will help combat this epidemic.

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The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none was reported.

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Drafting of the work was by AAD. MEZ prepared the methodology section, performed the statistical analysis and wrote the results section. AAD, MAHC and SN contributed to the introduction, and to the interpretation and discussion of the findings. NAAS supervised all aspects of the manuscript. All authors participated in editing and correcting the final manuscript. All aspects of the final manuscript were approved by all authors.

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