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Abstract

Background: The Global Youth Tobacco Survey was conducted in Tunisia in 2001, 2007, 2010 and 2017. It is the only national survey that examined exposure to second-hand smoke and tobacco advertising among young people, and there has been no description of the trend.

Aims: To describe cigarette use trends among Tunisian adolescents and their exposure to second-hand smoke and tobacco advertising from 2001 to 2017.

Methods: The Global Youth Tobacco Survey is a school-based cross-sectional survey conducted by the World Health Organization. It uses a two-stage cluster sampling design to obtain a representative sample of students aged 13–15 years. A standardized questionnaire is used for data collection. We compared the prevalence and 95% confidence intervals (CI) of ever and current cigarette use, exposure to second-hand smoke in and outside the home, and exposure to tobacco advertising, over 4 years (2001, 2007, 2010 and 2017).

Results: Current cigarette use decreased from 11.1% (95% CI: 10.0–12.3%) in 2001 to 7.7% (95% CI: 6.5–9.0%) in 2017 (P

Conclusion: While the prevalence of cigarette use and second-hand smoke exposure at home decreased, exposure outside the home increased. Efforts are needed to ensure compliance with smoke-free laws to decrease the prevalence of exposure to second-hand smoke.

Keywords: tobacco, tobacco advertising, smoking, second-hand smoke, pollution, adolescent,

Global Youth Tobacco Survey, Tunisia.

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Introduction

Tobacco was the main cause of death among males in 2019 worldwide, responsible for 20% of deaths among males. For women, tobacco was the sixth leading cause of death worldwide, responsible for 15.4% of all deaths among women (1). Worldwide, in 2019, about 1.14 billion people aged 15 years and older smoked cigarettes (2). Generally, regular adult smokers began smoking during adolescence and one-third started at 14 years (3). People who smoke their first cigarette before the age of 18 years are more likely to become heavy smokers and nicotine dependent in the future, and are less likely to quit, which puts them at higher risk of lung cancer or other tobacco-induced diseases (4). Considerable effort has been made globally to control tobacco use by helping smokers to quit and preventing smoking initiation.

In 2004, a total of 603 000 deaths were estimated to be related to second-hand smoke; 28% of these deaths occurred among children (6). The increase in people's knowledge of the effects of tobacco use and second-hand smoke as a result of the media and anti-tobacco messages has helped tobacco control efforts (7). WHO launched the Framework Convention on Tobacco Control (FCTC) in 2003, which was the first international treaty on tobacco control (8). In line with the FCTC, WHO introduced the WHO MPOWER measures: M for monitoring tobacco use and prevention policies, P for protecting people from tobacco smoke; O for offering help to quit tobacco use; W for warning about the dangers of tobacco; E for enforcing bans on tobacco advertising, promotion and sponsorship; and R for raising taxes on tobacco.

Tunisia started a national strategic plan to curb the epidemic of tobacco use among adults and

young people in 1998. The strategy was further enforced by Tunisia's ratification of the FCTC in 2010 (10). In Tunisia, the prevalence of smoking among adult males was reported to be 48.3% (95% confidence interval (CI): 46.3–50.3%) by the Tunisian Health Examination Survey in 2016 (9). The Global Youth Tobacco Survey (GYTS) is a main component of the MPOWER plan of action. It is a multinational survey conducted by WHO (11) in more than 185 countries to monitor tobacco use among young people aged 13–15 years (12). In Tunisia, this survey has been conducted 4 times: in 2001, 2007, 2010 and 2017. To our knowledge, the GYTS is the only national survey that examined exposure to second-hand smoke and to the media and advertising among young people.

The aim of our study was to identify the trends in cigarette use among Tunisian adolescents from 2001 to 2017 and to describe their exposure to second-hand smoke and the media and advertising related to tobacco.

Methods

Study design

The GYTS is a cross-sectional, descriptive and school-based survey conducted by WHO. It uses a two-stage cluster sample design to obtain representative samples of students aged 13–15 years. In Tunisia, the age 13–15 years old matches students in the seventh, eighth and ninth school grades. In the GYTS, the complete list of all public schools is sent to the tobacco centre at the United States Centers for Disease Control and Prevention (CDC) where schools are chosen randomly in proportion to the number of students enrolled in the specified grade. Then, classes are randomly chosen according to the city population and size (one or two classes per school).

The GYTS in Tunisia is carried out in April and May of each survey year. Physicians and nurses of medical schools are responsible for data collection, under the direction of the medical school and university. The surveys are funded by WHO. Each student in the age range 13–15 years (seventh, eighth and ninth grades) in the selected classes who is present in the class on the day of survey is eligible to participate in the study.

Questionnaire

The GYTS survey uses a standard methodology and the questionnaire is validated by CDC and WHO experts (13). It contains core questions about the main tobacco concerns focusing on:

prevalence of all smoked tobacco products and conventional cigarettes

smokers' access to tobacco products

smokers' behaviours related to stopping smoking

exposure to the media and advertising

exposure to second-hand smoke.

The questionnaire has been translated into Arabic and then re-translated into English and sent back to CDC for further checks to ensure accuracy and reliability. It was first pretested with a focus group of adolescents to ensure the translation was pertinent and precise. The questionnaire contained 69 questions in 2001, 63 questions in 2007, 70 questions in 2010 and 63 in 2017: 27 questions are common to all 4 surveys.

We focused on trends in the prevalence of conventional cigarette smoking and exposure to second-hand smoke and to tobacco advertising.

Measures

Ever cigarette smoker was defined as someone who had ever smoked cigarettes, even if they had only taken 1 or 2 puffs in their lives. Current cigarette user was defined as someone who had smoked cigarettes anytime during the past 30 days, that is, had given any answer other than 0 days to the question: "In the past 30 days, how many days did you smoke cigarettes?"

Participants were considered to have been exposed to second-hand smoke inside the home if they gave any answer other than 0 days to the question: "In the past 7 days, how many days have people smoked in your home, in your presence?" Similarly, they were considered exposed outside the home if they gave any answer other than 0 days to the question and "In the past 7 days, how many days have people smoked in your presence in places other than in your home?"

Consent

Oral consent of parents of the students is usually taken the day before the survey.

Data analysis

Anonymized data were available at the official US CDC site (https://nccd.cdc.gov/GTSS/

rdPage.aspx?rdReport=OSH_GTSS.loreByLocation&

rdRequestForwarding=Form). We analysed the data using R version 4.2.0 and R studio version 2022.07.01 software. In each survey, adjusted and weighting factors were applied to each student record to adjust for the probability of selection and non-response (by school, class and student).

The weighting factor was: W = W1 × W2 × F1 × F2 × F3 × F4, where: W1 = the reverse of probability of selection of the school; W2 = the reverse of probability of selection of the class within the school; F1 = adjustment factor of non-response of schools according to size (large, medium, small); F2 = adjustment factor of class calculated by school; F3 = adjustment factor of student non-response calculated within this class; and F4 = adjustment factor post-stratification calculated by sex and grade.

The weighting factor was applied through the survey package of R Studio. Unweighted numbers of students were documented in tables. Indicators were described using weighted percentages reflecting the population estimates. We calculated the 95% confidence intervals (CI) for each proportion. The association between 2 qualitative variables was assessed with the chi-squared test. Trends were assessed using the Cochrane Armitage trend test. A two-sided 5% significance level was used for all calculations.

Results

From 2001 to 2017, the number of schools included in the survey increased from 50 to 67. The overall response rate varied from 94.1% (2942/3127) in 2001 to 92.9% (1863/2005) in 2017 (T able 1
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Conventional cigarettes

The male to female ratio was about the same in the 4 years: 0.97 in 2001 and 0.93 in 2017. In 2001, about 23.0% (95% CI: 21.5–24.5%) of the respondents had tried to smoke a cigarette, even if only one or two puffs: 35.4% (95% CI: 32.9–37.9%) of boys and 11.4% (95% CI: 9.9–13.1%) of girls. This proportion increased to 25.0% (95% CI: 23.1–27.1%) in 2017, with the increase greater among boys: 38.8% (95% CI: 35.6–42.0%) of boys and 11.6% (95% CI: 9.6–13.8%) of girls. However, these increases were not significant (P > 0.05).

As for current cigarette use, the prevalence decreased significantly from 11.1% (95% CI: 10.0–12.3%) in 2001 to 7.7% (95% CI: 6.5–9.0%) in 2017 (P Table 2).

Exposure to second-hand smoke

Between 2001 and 2017, exposure to second-hand smoke at home in the 7 days before the survey decreased significantly from 62.5% (95% CI: 60.7–64.2%) to 46.7% (95% CI: 44.5–49.0%; P Table 3).

Exposure to second-hand smoke outside the home increased significantly between 2001 and 2017, from 65.4% (95% CI: 63.7–67.1%) to 73.3% (95% CI: 71.2–75.3%; P Table 3).

Most respondents were in favour of implementing smoke-free public places by law, although this support decreased significantly from 87.0% (95% CI: 85.7–88.2%) in 2001 to 81.8% (95% CI: 80.0–83.5%) in 2017 (P Table 3)

Exposure to tobacco advertising

Exposure to anti-tobacco messages in the media deceased from 87.8% (95% CI: 86.3–89.1%) in 2001 to 64.4% (95% CI: 62.2–66.5%) in 2017 (P Table 4). The proportion of respondents who had received free promotional cigarettes was small and did not change significantly over the years (Table 4).

Discussion

The GYTS is one of the most important tobacco monitoring tools and helps countries implement the MPOWER package. The questions are in line with the MPOWER package and focus on important aspects of tobacco use and tobacco control. Monitoring the prevalence of tobacco use over time is essential to identify changes and link the national tobacco control strategy to the current situation.

Conventional cigarettes

One in 4 students had ever tried to smoke a cigarette: 1 boy out of 3 and 1 girl out of 10. In the United States, data from the National Youth Tobacco Survey from 2014 to 2016 showed that 21% of adolescents had ever tried to smoke a cigarette (14). The GYTS in the United Arab of Emirates in 2013 focused on expatriate adolescents only and reported that 32% of boys had tried to smoke a cigarette, at a mean age of 12–13 years (15). A previous Tunisian national survey, which included 4172 adolescents aged 12–20 years from public and private schools, reported that among students aged 12–14 years, 26.9% had tried to smoke a cigarette (16). In the Sfax Region in the south of Tunisia, ever cigarette smoking was reported in 16.7% of school students (32.6% of boys and 5.9% of girls) (17). Our findings are similar to these studies and indicate a high prevalence of cigarette experimentation among boys and girls in Tunisia.

Our findings show that the prevalence of current cigarette use among adolescent Tunisians has decreased over time, overall and for boys and girls. According to the last Youth Risk Behavior Survey in the United States conducted in 2019, a significant decrease in current cigarette use had occurred among students in the ninth grade (14–15 years), from 13.5% in 2009 (18) to 3.8% in 2019 (19). In a 45-country analysis of GYTS data in 2013 and 2014, the median global prevalence of current cigarette use across all countries was 6.8% (9.7% in boys and 3.5% in girls), which is lower than the prevalence in our 4 surveys overall and for boys, but higher than current cigarette use we found for girls. Given the findings of the 2017 GYTS in Tunisia, the country has the fourth highest prevalence of adolescent cigarette use in the Middle East and North African Region, after Jordan (2014 GYTS), Lebanon (2013 GYTS) and Qatar (2013 GYTS) (20). Other studies in North African countries showed that a greater proportion of Tunisian boys smoked than Egyptian, Libyan, Moroccan and Sudanese boys (21). In Malaysia, the prevalence of current cigarette use decreased from 19.9% in 2003 to 14.8% in 2016, which is almost double the prevalence in our study (22). In Morocco, the current cigarette use among 13–15-year-old schoolchildren increased from 3.0% in 2006 to 5.2% in 2010, but both were lower than the prevalence among Tunisian schoolchildren (23). In the city of Sousse in Tunisia, the results of a cross-sectional survey in 2013–2014 in 16 public schools showed that 4.5% of participants were cigarette users, which is lower than the national prevalence in the GYTS surveys (24). Even though cigarette consumption among Tunisian schoolchildren decreased between 2001 and 2017 it is however still high and needs to be tackled to reduce the prevalence further.

Exposure to second-hand smoke

Second-hand smoke outside the home among adolescents increased between 2001 and 2017 . A study in 131 countries found that exposure to second-hand smoke outside the home was 57.6% in 2018 and it had not decreased from 1999 – it remained the same in 46 of 131 countries (35.1%) and increased in 40 (30.5%). This increase was found in almost all WHO regions (exposure was 59.4% for exposure at least one day a week in the Middle East and North Africa Region) and in countries that did not ratify the FCTC (25). The overall exposure to second-hand smoke in public places among non-smoking adolescents was 44.2% across 168 countries between 2001 and 2017. The exposure was higher among boys than girls. Exposure ranged from 39.8% in the Middle East and North Africa Region to 73.7% in the European Region (26). In Africa, from 2006 to 2011, exposure to second-hand smoke among adolescents was 39.0%; it ranged from 24.9% in Cape Verde to 80.4% in Mali, with no differences between the sexes (27). These results show that exposure to second-hand smoke in Tunisia is among the highest in the world.

The proportion of students in favour of laws that establish smoke-free public places decreased for both sexes. Tunisia established its first tobacco law (no. 98-17) in February 1998 which aimed to protect people from tobacco harm. Article 10 of this law prohibits smoking in public places (28). This law was enforced by the decree of November 1998 (29), decree of September 2009 (30) and ratification of the FCTC in 2010. Article 8 of the FCTC calls on countries to adopt and implement effective national legislations to protect people from exposure to tobacco in indoor and outdoor public places (8). However, the compliance of Tunisians and respect for these laws seem to be weak given the high rates of exposure to second-hand smoke outside the home (31). In the most recent report of MPOWER in the Middle East and North Africa Region, Tunisia had a score of 1 out of 3 for smoke-free places, which means only up to 2 public places were completely smoke free (32). A longitudinal study found evidence that, in addition to positive impact on exposure to second-hand smoke, laws on smoke-free places led to a possible decrease in smoking prevalence (33).

Exposure to tobacco advertising

In the 2001 Tunisian GYTS, a greater proportion of respondents were exposed to anti-tobacco messages in the media (internet, magazines, television) than respondents in the 2017 GYTS. This result is similar to findings in Greece (34), Italy (35) and Myanmar (36). A longitudinal study in the United States found a positive effect of anti-tobacco messages on teenagers' susceptibility to tobacco smoke. In fact, this exposure decreased the susceptibility to tobacco smoke by 2 or 3 years (37). From 2010 to 2017, the proportions of students exposed to cigarette advertising at points of sale decreased. A systematic review in 2009 concluded that exposure to promotion of cigarette use at points of sale increased the odds of ever smoking, frequent smoking or occasional smoking (38). This explains why the tobacco industry spends around 80% of their advertising budget on promotions at points of sale (39). Article 13 of the FCTC calls on countries to ban every kind of tobacco promotions, advertisings and sponsorships. In Tunisia, law no. 98-17 forbids all types of promotion of tobacco products in public places, but it does not include a ban on promotion at points of sale (28).

Strengths and limitations

A strength of our study is that the GYTS is the only standardized worldwide survey on tobacco use and attitudes among adolescents aged 13–15 years. The GYTS is a national survey conducted in all governorates and cities in the country. The sample size of students who answered the questionnaire was large and the response rates were always more than 92%.

Our study has some limitations. Smoking behaviour and exposure to second-hand smoke were self-reported and no quantitative method was used to confirm the students' responses, which may introduce biases. Only students in public schools were included, thus students in private schools or adolescents who were not in school were not represented. Students in private schools and out-of-school teenagers represent about 10% of Tunisian adolescents (40).

Conclusions

WHO recommends that countries implement a monitoring survey every 5 years. It has been 5 years since the last GYTS in Tunisia and a new GYTS survey is needed. Efforts to ensure complete compliance with smoke-free public places law are needed to decrease the prevalence of exposure to second-hand smoke. A complete ban on point of sales promotions is strongly recommended to decrease the exposure of vulnerable young people to tobacco advertising.

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Competing interests: None declared.

Consommation de cigarettes et exposition à la fumée secondaire et à la publicité en faveur du tabac chez les adolescents tunisiens

Résumé

Contexte : L'enquête mondiale sur le tabagisme chez les jeunes a été menée en Tunisie en

2001, 2007, 2010 et 2017.

Il s'agit de la seule enquête nationale portant sur l'exposition à la fumée secondaire et à la publicité en faveur du tabac chez les jeunes. Aucune description de la tendance n'a été réalisée.

Objectif : Décrire les tendances de la consommation de cigarettes chez les adolescents tunisiens et leur exposition à la fumée secondaire et à la publicité en faveur du tabac, entre 2001 et 2017.

Méthodes : L'enquête mondiale sur le tabagisme chez les jeunes est une enquête transversale en milieu scolaire menée par l'Organisation mondiale de la Santé. L'enquête repose sur un échantillonnage en grappes à deux degrés afin d'obtenir un échantillon représentatif d'élèves âgés de 13 à 15 ans. Un questionnaire standardisé est utilisé pour la collecte de données. Nous avons comparé, sur la période des quatre années (2001, 2007, 2010 et 2017), la prévalence et les intervalles de confiance (IC) à 95 % de la consommation de cigarettes antérieure et au moment des enquêtes, l'exposition à la fumée secondaire à l'intérieur et à l'extérieur du domicile, ainsi que l'exposition à la publicité en faveur du tabac.

Résultats : La consommation de cigarettes au fil des enquêtes a diminué, passant de 11,1 % (IC à 95 % : 10,0-12,3 %) en 2001 à 7,7 % (IC 95 % : 6,5-9,0 %) en 2017 (p