Environmental Research 175 (2019) 79–83

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Smoke-free Turkey: Evaluation of outdoor areas of public places

Bekir Kaplan[a,*], Maria Grau-Perez[b], Asli Çarkoglu[c], Gül Ergör[d], Mutlu Hayran[e], Ana Navas-Acien[b], Joanna E. Cohen[a]

[a] Department of Health Behavior and Society, Institute for Global Tobacco Control, Johns Hopkins Bloomberg School of Public Health, Maryland, USA
[b] Department of Environmental Health Sciences, Columbia University Mailman School of Public Health, New York, USA
[c] Department of Psychology, Kadir Has University, Istanbul, Turkey
[d] Department of Public Health, Faculty of Medicine, Dokuz Eylul University, Izmir, Turkey
[e] Department of Preventive Oncology, Hacettepe University Cancer Institute, Ankara, Turkey

ARTICLE INFO

Keywords:
Turkey
Outdoor secondhand smoke

ABSTRACT

Significance: Secondhand tobacco smoke (SHS) exposure is a major cause of morbidity and mortality around the world. The objective of this study was to evaluate the presence of smoking in outdoor areas of public places in three largest Turkish cities (Istanbul, Ankara, and Izmir).

Method: For this cross-sectional observational study, the Turkish Statistical Institute randomly selected 10 sampling points in each city. Around each sampling point, fieldworkers visited the closest bars/nightclubs, cafes, government buildings, hospitals, restaurants, schools, shopping malls, traditional coffee houses, universities, children's playgrounds, parks and open markets. We observed smoking, ashtrays, and cigarette butts at the outdoor areas of public venues within the urban districts of each city. The fieldwork was conducted in April–May 2016.

Results: 477 venues were observed, covering 1017 outdoor locations in which 17,737 people were observed. Smoking in outdoor areas ranged from 3.7% around schools to 90% in open markets. Ashtrays were almost ubiquitous in hospitals (95.6%), shopping malls (92.0%), and universities (90.9%). Cigarette butts were more often observed in open markets (100%), shopping malls (96%), universities (95.5%), and parks (93.3%). Smoking at outdoor areas around schools was significantly lower than around other venues.

Conclusion: Smoking in outdoor areas was common in most public places in Turkey except schools. The current indoor SHS legislation should be extended to cover adjacent outdoor areas of public venues in order to effectively protect people from SHS exposure in Turkey.

1. Introduction

Secondhand tobacco smoke exposure is a major cause of morbidity and mortality around the world (US Department of Health and Human Services, 2006; Oberg et al., 2011). In 2008, Turkey passed a law banning smoking in all indoor public places that was expanded to bars, cafes and restaurants in 2009 (Republic of Turkey and Official Gazette No: 26761, 2676). The smoke-free law in Turkey prohibits the use of tobacco products in outdoor areas that are part of educational institutions including preschools, primary and secondary schools, private establishments preparing students for various examinations, and cultural and social service buildings (Republic of Turkey and Official Gazette No: 26761, 2676).

Evaluating outdoor public places is critical as outdoor smoking has become an emerging source of secondhand smoke exposure. Outdoor smoking near entrances can drift inside the buildings (Brennan et al., 2010). It can represent an occupational hazard for workers that need to spend time in those areas such as security guards and waiters, and also a source of exposure for those who need to pass through those areas. Beyond secondhand smoke exposure, observing smoking in outdoor places results in the normalization of smoking behavior and exposure of smoking behavior among children and other populations for whom observing smoking can be harmful such as recent quitters.

We previously conducted a systemic evaluation of the level of implementation and enforcement of Turkey's smoke-free legislation in indoor places (Navas-Acien et al., 2016). We found that although compliance was high across all the 12 Turkish cities evaluated, it remained below 100%, especially in bars and nightclubs, traditional coffee houses, and dining areas in hospitals and government buildings (Navas-Acien et al., 2016). Moreover, smoking was widespread in

* Corresponding author.2213 McElderry Street Fourth Floor, Baltimore, MD, 21205, USA.
E-mail address: bkaplan9@jhu.edu (B. Kaplan).

https://doi.org/10.1016/j.envres.2019.05.003
Received 18 February 2019; Received in revised form 22 April 2019; Accepted 2 May 2019
Available online 03 May 2019

Table 1
Outdoor observations of venues in 3 major cities, Turkey, 2016

Venue Type	No. of Venues	No. of Locations	No. of People Observed	Mean No. of Smokers per Venue	No. (%) of venues with observed[a]:			
					Smoking[b]	Ashtray[b]	Cigarette Butt[b]	Likely Smoking[b]
Total	477	1017	17,737	2.8	254 (53.3)	335 (70.2)	286 (59.9)	392 (82.2)
Hospital	45	121	1855	4.7	36 (80.0)	43 (95.6)	40 (88.9)	43 (95.6)
University	22	54	1131	6.9	16 (72.7)	20 (90.9)	21 (95.5)	21 (95.5)
Government Building	56	75	530	1.0	18 (32.1)	45 (80.4)	48 (85.7)	48 (85.7)
Shopping Mall	25	43	582	4.2	18 (72.0)	23 (92.0)	24 (96.0)	25 (100.0)
School	54	139	2311	0.1	2 (3.7)	4 (7.4)	6 (11.1)	6 (11.1)
Park	30	88	1524	2.4	17 (56.7)	11 (36.7)	28 (93.3)	28 (93.3)
Children's Playground	20	72	646	1.1	5 (25.0)	5 (25.0)	16 (80.0)	16 (80.0)
Open Market	20	21	5263	5.6	18 (90.0)	1 (5.0)	20 (100.0)	20 (100.0)
Hospitality	205	410	3895	2.9	124 (60.5)	183 (89.3)	83 (40.5)	185 (90.2)
Restaurant	83	169	1032	1.5	38 (45.8)	74 (89.2)	28 (33.7)	74 (89.2)
Modern Café	31	63	706	4.2	20 (64.5)	28 (90.3)	8 (25.8)	28 (90.3)
Traditional Coffee House	51	98	1117	3.4	39 (76.5)	46 (90.2)	38 (74.5)	48 (94.1)
Bar/Nightclub	40	76	1026	4.1	27 (69.2)	34 (87.2)	9 (23.1)	34 (87.2)

[a] At least one observation in any location of the venues.
[b] $p < 0.001$ (Chi Square test).

outdoor areas near entrances and in patios/gardens in most public places such as hospitals, universities, malls, coffee/tea houses and bars/nightclubs.

Our previous study in Turkey was limited because the evaluation in the three largest cities (Istanbul, Ankara, and Izmir) was conducted during the winter when smoking outdoors is less prevalent compared to spring and summer months. The objective of this study was to evaluate outdoor area of public places with regard to smoke-free legislation in three largest Turkish cities (Istanbul, Ankara, and Izmir) in the spring season. This study can provide critical data to inform legislation in Turkey regarding smoking in public outdoor areas.

2. Method

2.1. Study population

In this cross-sectional observational study, we studied public venues in three largest cities (Istanbul, Ankara and Izmir) in Turkey. Within the urban districts of each city, the Turkish Statistical Institute randomly selected 10 sampling points. Around each sampling point, our fieldworkers visited the closest bars/nightclubs, cafes, government buildings, hospitals, restaurants, schools, shopping malls, traditional coffee houses, universities, children's playgrounds, parks and open markets (street market). The fieldworkers gradually expanded the search until one or two of each type of venue was located in each sampling area and a pre-specified target number of venues of each type was located per city. The target numbers, which had been set by a consensus panel before the field work began, took into account the size of the city, the rarity of the type of venue and the allocated fieldwork duration –two weeks in each major city. A letter from the Ministry of National Education authorized access to schools. All other venues allowed public access. The fieldwork was conducted in April–May 2016. Institutional review boards at the Johns Hopkins University in Baltimore (United States of America) and at Doğuş University in Istanbul (Turkey) approved the study protocol.

2.2. Data collection

Following a standardized protocol, trained fieldworkers conducted all the observations working in pairs and visited each study venue during the venue's regular working hours. In each visited venue, the fieldworkers followed a standard itinerary and evaluated a pre-specified number of study locations. In the visited venues, the locations (when present) included: the main entrance, garden, terrace, patio, outdoor dining area, parking lot, children's playground, sport field, a 10 m area from central point (entrance), benches/sitting area and walkway.

In each study location, the fieldworkers recorded the number of people present, number of people smoking, presence of ashtrays, presence or absence of cigarette butts, and number of cigarette butts. For each sampling location, the exact date and time were recorded.

2.3. Data analysis

We determined the percentage of the visited venues of each main type in which we observed at least one individual who was smoking, one ashtray, and one cigarette butt in the outdoor study locations. We created a measure of “Likely Smoking” by combining the presence of ashtray and cigarette butt questions into one variable in order to better estimate likelihood of smoking in the venues.

We used Chi Square test to compare percentages of observations between the venue types. We used logistic regression models to investigate factors associated with the presence of ashtrays controlling for venue type, city, and visit time. The models provided adjusted odds ratios (aOR) with 95% confidence intervals (CI). P-values less than 0.05 were considered statistically significant.

All analyses were performed using Stata version 13.1 (StataCorp. LP, College Station, USA).

3. Results

The fieldworkers' observations, made in a total of 477 venues, covered 1017 outdoor locations in which 17,737 people were observed (Table 1). Of the venues, 45 (9.4%) were hospitals, 22 (4.6%) universities, 56 (11.7%) government buildings, 25 (5.2%) malls, 54 (11.3%) schools, 30 (6.3%) parks, 20 (4.2%) children's playgrounds, 20 (4.2%) open markets and 205 (43%) hospitality venues. Of the hospitality venues, 83 (40.5%) were restaurants, 31 (15.1%) modern cafés, 51 (24.9%) traditional coffee houses and 40 (19.0%) bar/night clubs (Table 1).

We observed 136 (28.5%) venues in Ankara, 206 (43.2%) in Istanbul and 135 (28.3%) in Izmir. Of the venues, 63.9% (n = 305) were observed between 10:00–17:00 and 36.1% (n = 172) between 17:00–22:30.

3.1. Observations by venue type

The proportion of observed smoking, ashtray, and cigarette butts were 53.3%, 70.2%, and 59.9%, respectively, in any outdoor location of venues (Table 1).

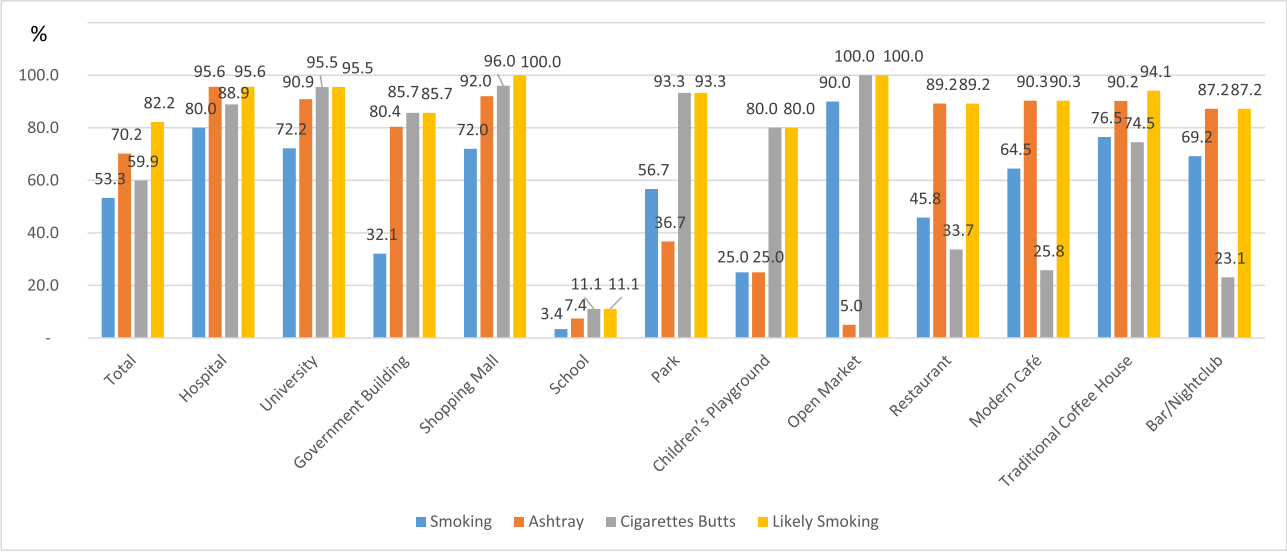

Fig. 1. Outdoor observations of smoking, ashtray, and cigarette butts in public venues, Turkey, 2016

Smoking was most common in open markets (90.0%), hospitals (80.0%), traditional coffee houses (76.5%), universities (72.7%) and shopping malls ($p < 0.001$) (72.0%) (Table 1) (Fig. 1).

Outdoor ashtrays were more often observed in hospitals (95.6%), shopping malls (92.0%), universities (90.9%), modern cafés (90.3%) and traditional coffee houses (90.2%) compared to the other venues ($p < 0.001$) (Table 1) (Fig. 1).

Cigarette butts were more often observed in open markets (100.0%), shopping malls (96.0%), universities (95.5%), parks (93.3%), and hospitals (88.9%) ($p < 0.001$) (Table 1) (Fig. 1).

In the outdoor areas of schools, smoking, cigarette butts, and ashtrays were significantly lower than in the outdoor areas of other venues ($p < 0.001$) (Table 1) (Fig. 1); however, 7.4% of outdoor areas of schools had ashtrays.

The proportion of observed smoking, ashtray, cigarette butts, and likely smoking (ashtray and butts combined) were 53.3%, 70.2%, 59.9%, and 82.2% respectively, in any outdoor location of venues (Table 1) (Fig. 1).

The shopping malls (100.0%) and open markets (100.0%) had the highest percentage of likely smoking (at least one observed ashtray or cigarette butt), followed by hospitals (95.6%), universities (95.5%), and traditional coffee houses (94.1%) (Table 1) (Fig. 1).

3.2. Observations by different areas of venues

Smoking was more often observed in the walkways (88.9%), parking lots (74.3%) and patios (67.7%) of the venues. Outdoor dining areas (91.0%), entrances (78.5%) and patios (74.2%) had the three highest proportions of observed ashtrays. The proportion of observed cigarette butts was also high in the 10 m from the venues' central point (91.7%) and in children's playgrounds (90.6%) (Table 2) (Fig. 2).

The walkways (100.0%) had the highest percentage of likely smoking (at least one observed ashtray or cigarette butt), followed by the parking lots (95.7%), the areas 10 m from central point (91.7%), outdoor dining areas (91.2%), and children's playground (90.6%) (Table 2) (Fig. 2).

In the current study, the presence of ashtrays was strongly associated with the presence of cigarette butts (aOR: 66; 95%CI: 16–262) in the outdoor area of the venues after adjustment for venue type, city, venue visit time and smoking.

4. Discussion

In this evaluation, we found that smoking was common in the outdoor areas of public venues across three largest cities in Turkey. The presence of smoking, ashtrays, and cigarette butts were particularly common in outdoor areas of hospitals and universities (range between 72.7% and 95.6%). However, smoking was markedly low in the outdoor areas of schools, which are covered by the current legislation.

In February 2015, the Turkish Ministry of Health released a circular, proposing a ban on the use of tobacco and tobacco products in certain outdoor areas at public institutions and agencies, as well as public outdoor areas used by children (e.g., playgrounds) or created for physical activity (e.g., walking trails, sports grounds) (National Public Health Agency of Turkey, 2015–2018). In addition, the circular also proposed a ban on the use of tobacco and tobacco products within at least 5 m of the entrance to public buildings considered indoor space with mass movement of people (e.g., airports, bus terminals, train stations, shopping malls, cinemas, theatres and health facilities). (National Public Health Agency of Turkey, 2015–2018).

Turkey's smoke-free law in all indoor public places including hospitality venues and in outdoor areas of schools came into effect in 2009 (Republic of Turkey and Official Gazette No: 26761, 2676). We formerly reported high compliance in the non-dining areas of government buildings, hospitals, malls, schools and universities (Navas-Acien et al., 2016), signaling successful implementation of the law. Banning indoor smoking seems to displace smoking to adjacent outdoor areas such as patios (Sureda et al., 2012; Cameron et al., 2010), and smoking in outdoor areas adjacent to indoor smoke-free areas appears to increase secondhand smoke concentrations in both indoor and outdoor areas (Sureda et al., 2013). Smoke-free policies, on the other hand, can reduce smoking in outdoor areas (Johns et al., 2015; Okoli et al., 2013), especially when implemented as part of comprehensive smoke-free efforts that ban indoor and outdoor smoking (Lupton and Townsend, 2015; M1Neudorf and Opondo, 2008). Therefore, the current indoor SHS legislation should be extended to cover adjacent outdoor areas of venues in order to effectively protect people from SHS in Turkey.

The current study indicates that there was a strong association between presence of ashtrays and cigarette butts in the outdoor areas of venues. In a study measuring indoor PM2.5 concentration in hospitality venues, it was reported that indoor PM2.5 concentrations were strongly associated with the presence of ashtrays in hospitality venues in Greece (Vardavas et al., 2013). We formerly reported that the presence of ashtrays could be a major facilitator of smoking inside venues in Turkey

Table 2
Outdoor observations of smoking, ashtrays, and cigarette butts in the different areas of public venues, Turkey, 2016

Locations (N:477)	No. of Areas	No. (%) of outdoor locations with observed:				
		Smoking	Ashtray	Cigarette Butts		Likely Smoking
				No. (%)	Median (Q1, Q3)	
1-Entrance	405	213 (52.6)	318 (78.5)	220 (53.3)	15 (5, 51)	326 (80.5)
2-Garden	95	32 (33.7)	40 (42.1)	48 (50.5)	51 (0, 51)	48 (50.5)
3-Terrace	2	0 (0.0)	0 (0.0)	0 (0.0)	0 (0, 0)	0 (0, 0)
4-Patio	31	21 (67.7)	23 (74.2)	23 (74.2)	51 (20, 51)	25 (80.6)
5-Outdoor Dining Area	234	153 (65.4)	213 (91.0)	110 (47.1)	15 (5, 51)	215 (91.2)
6-Parking Lot	70	52 (74.3)	59 (84.3)	60 (85.7)	51 (51, 51)	67 (95.7)
7-Children's Playground	32	14 (43.7)	9 (28.1)	29 (90.6)	7 (2, 51)	29 (90.6)
8-Sport Field	38	7 (18.4)	3 (7.9)	12 (31.6)	0 (0, 2)	12 (31.6)
9-Ten m from Central Point	48	22 (45.8)	16 (33.3)	44 (91.7)	51 (20, 51)	44 (91.7)
10-Benches/Sitting Area	50	23 (46.0)	14 (28.0)	44 (88.0)	51 (27, 51)	44 (88.0)
11-Walkway	18	16 (88.9)	1 (5.6)	18 (100.0)	51 (51, 51)	18 (100.0)

(Navas-Acien et al., 2016). These findings point to ashtrays as a modifiable factor related to smoking behavior and should be removed from all public places including outdoor areas. The fact remains that we reported lower presence of cigarette butts at the outdoor areas of hospitality venues in the current study. A potential explanation could be that hospitality venues are more often cleaned by employees to increase customer satisfaction.

Smoking was more often observed in all kinds of hospitality venues in the spring season compared to the winter season three years previous (Navas-Acien et al., 2016). Furthermore, presence of ashtray was also higher in all venue types in the spring season. These findings indicate a deterioration of enforcement in hospitality venues over time in Turkey.

Some of the strengths of our study include the use of a systematic protocol and training and the random sampling strategy followed in each city. In addition, we used a guide on smoke-free compliance studies (Assessing compliance with, 2014) to evaluate the implementation of Turkey's smoke-free legislation on a large scale. While the guide has been used previously (Tripathy et al., 2013; Goel et al., 2014), few studies have implemented it rigorously and comprehensively.

This study has some limitations. Fieldworkers were unable to observe outdoor areas of the studied government buildings, hospitals and universities that are inaccessible to the public (e.g. patios within the building or some terraces); the extent of smoking in these outdoor areas remains unknown. We were unable to determine if our results are representative of other cities, towns and communities in Turkey or whether compliance in rural areas of Turkey is similar to that which we recorded. Due to limited resources, we were not able to observe whether outdoor smoking occurred during outdoor sport, cultural, art, and entertainment activities. Outdoor smoking during those activities is prohibited by the smoke-free law in Turkey. Therefore, our results do not cover all outdoor areas covered by the smoke-free law. These places should be taken into account in further evaluations.

Widespread smoking behavior contributes to maintaining the social acceptability of smoking (Mead et al., 2014). Our observational data from Turkey are relevant for public health professionals and entities responsible for protecting the public from exposure to second-hand smoke. In outdoor areas, near entrances and on patios/gardens, exposure to secondhand smoke is widespread and our findings support the need for legislation to protect individuals who spend time in such areas.

5. Conclusion

We found smoking was widespread in outdoor areas of public venues of Turkey that are not covered by legislation, while smoking was rare in the outdoor areas of schools which are currently covered by the smoke-free legislation. The current smoke-free legislation should be extended to cover adjacent outdoor areas of venues in order to effectively protect people from SHS exposure in Turkey.

Funding

This study was supported by the Institute for Global Tobacco Control at the Johns Hopkins Bloomberg School of Public Health (#119187) with funding from the Bloomberg Initiative to Reduce Tobacco Use.

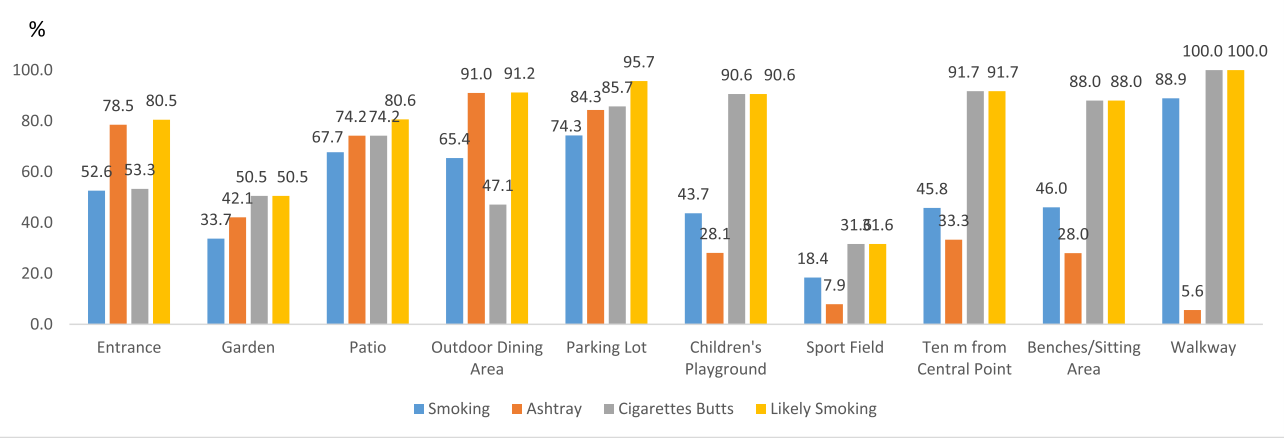

Fig. 2. Outdoor observations of smoking, ashtrays and cigarette butts in different areas of public places, Turkey, 2016

Declaration of interests

The authors declare no potential conflicts of interest.

Author contributions

Conceptualization, A.N.A., J.E.C.; Methodology, B.K., A.C., G.E., M.H., A.N.A.; Investigation, B.K., A.C., G.E., M.H., A.N.A.; Resources, B.K., M.G.P., A.C., G.E., M.H., A.N.A.; Data Curation, B.K. M.G.P; Writing – Original Draft Preparation, B.K., A.N.A.; Writing – Review & Editing, B.K, M.G.P., A.C., G.E., M.H., J.E.C., A.N.A.; Supervision, J.E.C., A.N.A; Project Administration, B.K., A.C., G.E., M.H., A.N.A., J.E.C.; Funding Acquisition, A.N.A, J.E.C."

References

Assessing Compliance with Smoke-free Laws: a "How-to" Guide for Conducting Compliance Studies. International Union Against Tuberculosis and Lung Disease, Edinburgh. https://www.theunion.org/what-we-do/publications/technical/english/compliance-guide_v4smallerfile.pdf, Accessed date: 18 February 2019.

Brennan, E., Cameron, M., Warne, C., et al., 2010. Secondhand smoke drift: examining the influence of indoor smoking bans on indoor and outdoor air quality at pubs and bars. Nicotine Tob. Res. 12 (3), 271–277. https://doi.org/10.1093/ntr/ntp204.

Cameron, M., Brennan, E., Durkin, S., et al., 2010. Secondhand smoke exposure (PM2.5) in outdoor dining areas and its correlates. Tobac. Contr. 19 (1), 19–23. https://doi.org/10.1136/tc.2009.030544.

Goel, S., Ravindra, K., Singh, R.J., Sharma, D., 2014. Effective smoke-free policies in achieving a high level of compliance with smoke-free law: experiences from a district of North India. Tobac. Contr. 23 (4), 291–294. https://doi.org/10.1136/tobaccocontrol-2012-050673 PMID: 23322311.

Johns, M.1, Farley, S.M.1, Rajulu, D.T., et al., 2015 Sep. Smoke-free parks and beaches: an interrupted time-series study of behavioural impact in New York City. Tobac. Contr. 24 (5), 497–500. https://doi.org/10.1136/tobaccocontrol-2013-051335.

Lupton, J.R., Townsend, J.L., 2015. A systematic review and meta-analysis of the acceptability and effectiveness of university smoke-free policies. J. Am. Coll. Health 63 (4), 238–247. https://doi.org/10.1080/07448481.2015.1015029.

M1, Lemstra, Neudorf, C., Opondo, J., 2008. Implications of a public smoking ban. Can. J. Public Health 99 (1), 62–65.

Mead, E.L., Rimal, R.N., Ferrence, R., Cohen, J.E., 2014 Aug. Understanding the sources of normative influence on behavior: the example of tobacco. Soc. Sci. Med. 115 (115), 139–143. https://doi.org/10.1016/j.socscimed.2014.05.030.

National Public Health Agency of Turkey, 2015-2018. The Circular about National Tobacco Control Action Plan. Accessed Date: 27 Jan 2017. https://www.thsk.gov.tr/guncel/duyurular/214-t%C3%BCt%C3%BCn-ve-di%C4%9Fer-ba%C4%9F%C4%B1ml%C4%B1kl%C4%B1k-yap%C4%B1c%C4%B1-maddelerle-m%C3%BCcadele-daire-ba%C5%9Fkanl%C4%B1%C4%9F%C4%B1-duyurular/ulusal-tutun-kontrol-programi-eylem-plani-2015-2018-hakkinda-genelge.html.

Navas-Acien, A., Carkoglu, A., Ergor, G., Hayran, M., Erguder, T., et al., 2016. Compliance with smoke-free legislation within public buildings: a cross-sectional study in Turkey. Bull. World Health Organ. 94, 92–102. https://doi.org/10.2471/BLT.15.158238.

Oberg, M.J.M., Woodward, A., et al., 2011. Worldwide burden of disease from exposure to second-hand smoke: a retrospective analysis of data from 192 countries. Lancet 377, 139e46. https://doi.org/10.1016/S0140-6736(10)61388-8.

Okoli, C., Johnson, A., Pederson, A., et al., 2013. Changes in smoking behaviours following a smokefree legislation in parks and on beaches: an observational study. BMJ Open 3 (6). https://doi.org/10.1136/bmjopen-2013-002916. e002916.

Republic of Turkey, Official Gazette No: 26761. Tütün Mamullerinin Zararlarinin Önlenmesine Dair Kanunda Değişiklik Yapilmasi Hakkinda Kanun. http://www.resmigazete.gov.tr/eskiler/2008/01/20080119-1.htm (Accessed Date: 8 Jan 2019)..

Sureda, X., Martinez-Sanchez, J.M., Lopez, M.J., et al., 2012. Secondhand smoke levels in public building main entrances: outdoor and indoor PM2.5 assessments. Tobac. Contr. 21 (6), 543–548. https://doi.org/10.1136/tobaccocontrol-2011-050040.

Sureda, X., Fernandez, E., Lopez, M.J., Nebot, M., 2013. Secondhand tobacco smoke exposure in open and semi-open settings: a systematic review. Environ. Health Perspect. 121 (7), 766–773. https://doi.org/10.1289/ehp.1205806.

Tripathy, J.P., Goel, S., Patro, B.K., 2013. Compliance monitoring of prohibition of smoking (under section-4 of COTPA) at a tertiary health-care institution in a smoke-free city of India. Lung India 30 (4), 312–315. https://doi.org/10.4103/0970-2113.120607 PMID: 24339489.

US Department of Health and Human Services, 2006. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, Atlanta, GA.

Vardavas, C.I., Agaku, I., Patelarou, E., Anagnostopoulos, N., Nakou, C., Dramba, V., et al., 2013. Ashtrays and signage as determinants of a smoke-free legislation's success. PLoS One 8 (9). https://doi.org/10.1371/journal.pone.0072945. e72945.