Changing the smoking habit: prevalence, knowledge and attitudes among Umbrian hospital healthcare professionals

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Keywords

Tobacco smoking • Prevalence • Health personnel • Health promotion • Hospital

Summary

Background. *Health care professionals should work against smoking habit to promote a correct life style. This study aimed to evaluate smoking prevalence and attitudes towards tobacco among Umbrian hospital professionals in a period between 2006 and 2015, since the approbation of the law that ban smoking in hospitals and all public areas in 2003.*
Methods. *A cross-sectional study was carried out using a questionnaire administered in 2006, 2011 and 2015 to healthcare professionals. It consists of 53 multiple-choice questions. Potential predictors of current smoking habits were evaluated using univariate and multivariate logistic regression.*
Results. *The sample included 475 healthcare professionals. Current smokers constituted 34.53% of the sample and no significant difference (p = 0.257) emerged in prevalence over time (33.74%*

in 2006; 36.02% in 2011 and 33.77% in 2015). The risk of being a smoker increased by not considering the smoking habit as the main cause of preventable deaths (OR = 2.25; 95% CI: 1.47-3.45). The strongest risk factor, which was significant in both models (p < 0.01), was being against the "No Smoking" law (OR = 18.90; 95% CI: 2.43-147.71; adjusted OR = 22.10; 95% CI: 1.85-264.78).
Conclusions. *The hospital staff has higher prevalence of smoking than the general population. The No Smoking law alone has been shown to be inadequate. Effective results can be achieved only by a common strategy and shared intervention programmes that are based on a workplace health promotion strategy. That for the moment has demonstrated to give interesting outcomes in modifying deep-rooted behaviour patterns.*

Introduction

According to the World Health Organisation (WHO) the smoking habit causes 10% of adult deaths and is the second cause of preventable deaths. Although the prevalence of smokers has dropped worldwide since 1980, the number of smokers has risen markedly as the population has increased [1]. There were 10.9 million smokers in Italy in 2015 (6.3 million males, 4.6 million females, prevalence 20.8%) [2]. As the WHO indicated, anti-smoking laws are one of the most efficacious public health strategies in the fight against smoking. Laws that protect non-smokers from passive smoking i.e. No Smoking areas, have beneficial effects on smokers and non-smokers. Italy has long been to the forefront in Europe in protecting non-smokers and with art. 51, Law No. 3 dated 16th January 2003, otherwise known as "Safeguarding the health of non-smokers", Italy extended no-smoking areas to all indoor areas except private homes and areas that are specially reserved for smokers. Smoking was forbidden in hospitals by Law No. 584 dated 11th November 1975. The law on "No smoking in certain places and on public transport" had established that smoking was prohibited only in some places like hospital wards, school class-

rooms, station waiting-rooms and other indoor spaces that were used by the public. Despite specific laws and precise regulations Italian hospitals still cannot be called smoke-free [33]. The present study aimed as assessing how the smoking habits of healthcare professionals in Umbrian hospitals changed 3, 8 and 12 years after implementation of art. 51, Law No. 3 dated 16th January 2003, which prohibited smoking in indoor areas that are open to the public.

Methods

A multi-centre, cross-section, observational study was conducted in hospitals under the management of Local Health Agency 1 (ex ASL 1) in Umbria. In March 2006, March 2011 and March 2015, healthcare professionals replied anonymously to a questionnaire that had previously been validated in an Italian National multi-centre study, published in 2010 [3].

THE QUESTIONNAIRE

The questionnaire included 53 open and closed questions which were divided into seven sections:

- section 1 asked about demographics with questions on age, gender, job and Health service workplace;
- section 2 assessed what the responder knew about smoking, asking for example about diseases caused principally by smoking and the main reasons why it was worth forbidding smoking in hospitals;
- section 3 assessed the healthcare professional's attitude to anti-smoking legislation and to colleagues who broke the law;
- section 4 assessed the workplace by investigating whether "no smoking" notices were posted and what rooms colleagues used for smoking;
- section 5 monitored smoking-related clinical activity by analysing patient-related actions;
- section 6 inquired exclusively about the healthcare professionals' smoking habits;
- section 7 was answered only by current smokers and asked questions about how often they smoked, attempts to stop smoking, etc.

STATISTICAL ANALYSIS

Descriptive statistics was performed using frequencies, percentages, frequency tables for categorical variables and mean ± standard deviation (SD) for quantitative variables. Non-parametric Mann-Whitney Test was performed to compare continues variable with no normal distribution. Categorical variables were evaluated by chi-square analysis or Fisher's exact test were appropriate. To test the goodness of fit for the logistic regression model the Hosmer and Lemeshow test was performed. All the variable including in the final model had a P-value < 0.25 (not for the administrations).

All the estimates are obtained after Multivariate Imputation by Chained Equations (MICE) approach to handle missing values [4]. This method has three steps. First, for each variable with missing values, a regression equation is created. This model includes the follow-up time and other model covariates. For binary variables this was a logistic regression, and for ordered categorical variables, an ordinal logistic regression. Once all such regression equations are defined, missing values are replaced by randomly chosen observed values of each variable in the first iteration. For subsequent iterations, missing values are replaced by a random draw from the distribution defined by the regression equations. This was repeated for 500 iterations, the final value being the chosen imputed value. This is similar to Gibbs sampling [5]. This entire process was repeated 100 times, thus creating 100 imputed data sets. The next step was to estimate the model for each of these data sets. Finally, the model coefficients are averaged according to Rubin's rule [6]. This ensures that the estimated standard error of each averaged coefficient reflects both between and within imputation variances, giving valid inferences. Univariate estimates under the Logit model are shown in the first column, multivariate estimates are shown in the second colon. A p-value of less then 0.05 was consider to be statistically significant. After estimation we recognize average predicted probabilities (APP) based on logistic regression (not in table).

Statistical analysis were performed with STATA 14.1 (StataCorpLP, Collage Station TX, USA).

Results

The sample included 475 healthcare professionals, 163 of whom responded to the questionnaire in 2006, 161 in 2011 and 151 in 2015.

Descriptive statistics for the dataset we analyse are reported in Table I. This table summarises the percentage of current smokers in different category.

Females constituted 62.32% of the total. Mean age was 41.78 years (range: 20-66). Doctors made up 16.21% of the sample, 4.63% were medical or nursing students, 43.79% were nurses or ward auxiliaries and 35.37% were other healthcare professionals or technicians.

Current smokers and ex-smokers constituted respectively 34.53 and 24.21% of the sample population. No significant difference (p = 0.257) emerged in prevalence of smokers over time (33.74% in 2006; 36.02% in 2011 and 33.77% in 2015). Current smokers included doctors (12.80%), students (6.10%), nurses or ward auxiliaries (42.68%) and technicians or other professionals (38.41%). Mean age at smoking cessation was 30.8 ± 7.88 years (males 31.25 ± 8.36; females 30.41 ± 7.51).

In the sample population of health workers 50.53% identified the smoking habit as the principal cause of preventable deaths in Italy. A significant (p = 0.004) difference emerged over time as 57.06% in 2006 dropped to 38.41% in 2015. Under half the sample population (43.58%) believed smoking was more dangerous than industrial or traffic pollution. Almost all health workers recognized that smoking was a major risk factor for respiratory and cardiovascular diseases (97.47% and 93.05% respectively); 99.16% knew that smoking was forbidden by law in public places and 97.05% were aware that passive smoke was a health hazard. Even though 57.89% of health workers considered their life-style was a behaviour model for the general population, a significant (p = 0.005) difference emerged over time as the percentage fell from 58.28% in 2006 to 54.97% in 2015. The argument that smoking is harmful and seriously damages health was used both to attempt to dissuade patients and health workers from smoking (94.74%) and to eliminate smoking from hospitals (71.79%).

Even though the majority (92.84%) of the sample population agreed with the law that prohibited smoking in hospitals, significant (p < 0.001) differences emerged over time. In 2006, 95.09% agreed with the new law, rising to 96.27% in 2011 but then dropping sharply to 86.75% in 2015. According to 93.47% of the sample, whoever breaks the law should be penalized but faced with a colleague who smoked only 1.05% take steps to ensure the law was enforced, 29.26% walk away and 29.89% say nothing.

Even though "No Smoking" signs were noticed by 96.21% of healthcare professionals in their Units, 26.95% "often" saw their colleagues smoking in the

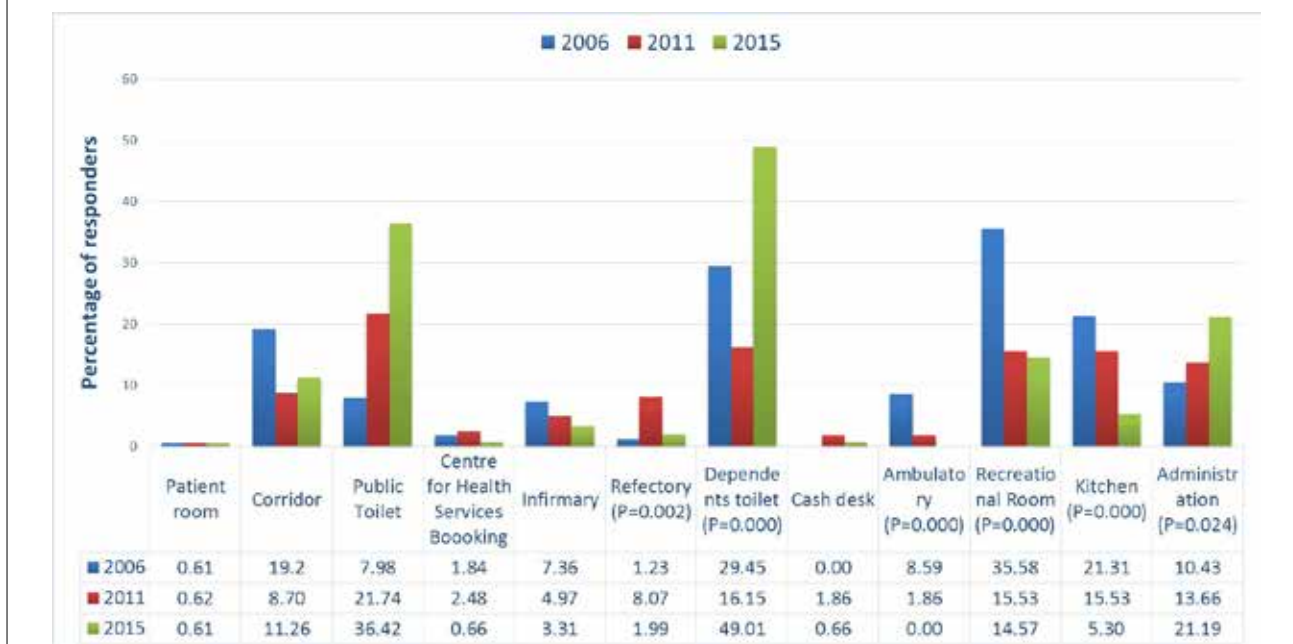Tab. I. Frequency distribution of the characteristics for smokers.

	Variables (N)	Current smoking total percentage (95%CI)	(p-value)
Gender	Male (179)	32.96 (26.13 - 40.36)	0.577
	Female (296)	35.57 (30.02 - 41.22)	
	Missing	-	
Profession	Medical doctor (77)	27.27 (17.74 - 38.62)	0.298
	Student (22)	45.45 (24.39 - 67.80)	
	Nurse and auxiliary employees (208)	33.65 (27.27 - 40.51)	
	Technician and others (168)	37.50 (30.16 - 45.29)	
	Missing		
Operative Unit	Medical departments (75)	34.67 (24.04 - 46.54)	0.932
	Surgical departments (93)	35.48 (25.83 - 46.09)	
	Other (290)	33.79 (28.37 - 39.55)	
	Missing (17)	41.18 (18.44 - 67.07)	
Behavioural model (for the population)	Yes (275)	28.36 (23.11 - 34.09)	**< 0.001**
	No (150)	47.33 (39.13 - 55.64)	
	Don't know (45)	33.33 (20.00 - 48.95)	
	Missing (5)	-	
Tobacco use is the most preventable cause of death	Yes (240)	25.83 (20.42 - 31.86)	**< 0.001**
	No (159)	44.03 (36.17 - 52.10)	
	Don't know (71)	42.25 (30.61 - 54.56)	
	Missing (5)	40.00 (5.27 - 85.36)	
Favour the law banning smoking in hospital	Yes (441)	31.75 (27.42 - 36.31)	**< 0.001**
	No (11)	90.91 (58.72 - 99.77)	
	Don't know (19)	63.16 (38.36 - 83.71)	
	Missing (4)	50.00 (6.75 - 93.24)	
Favour penalties for smokers in hospital	Yes (444)	33.11 (28.74 - 37.70)	**< 0.027**
	No (28)	53.57 (33.87 - 72.49)	
	Missing (3)	66.67 (9.43 - 99.16)	
Attitudes towards colleagues that smoke	Make sanction (3)	33.33 (0.84 - 90.57)	**< 0.001**
	Make him/her move (65)	30.77 (19.91 - 43.48)	
	Give a warning (12)	25.00 (5.50 - 57.18)	
	Move away (107)	20.56 (13.36 - 29.46)	
	Exhort to stop (123)	11.38 (6.36 - 18.36)	
	Say nothing (142)	61.57 (53.45 - 69.98)	
	Missing (23)	69.57 (47.08 - 86.79)	
Administration	2006 (163)	33.74 (26.53 - 41.55)	0.886
	2011 (161)	36.02 (28.62 - 43.95)	
	2015 (151)	33.77 (26.29 - 41.91)	

Bold indicates p < 0.05.

hospital ("never" 22.11%; "seldom" 18.11%; "occasionally" 32.42%). Most were found smoking in the staff toilets (31.16%). (Fig. 1) Interestingly, smoking in toilets and offices increased over time while smoking in corridors, kitchens and community rooms dropped.

During case-history recording 24.84% of health care workers declared patients were not asked about their smoking-habit. Only 14.32% stated that detailed information about the patient's smoking habit was elicited e.g. how many years the patient had smoked, how many and what type of cigarettes, when the smoking habit started and stopped, attempts to quit smoking and exposure to passive smoke. Significant (p = 0.007) intra-Unit differences emerged in case-history taking. Details on

the patient's smoking habit were recorded in 19.35% of Surgery Units and in only 4.00% of Medical Units. An anti-smoking centre existed in the hospital where they worked according to only 10.74% of healthcare workers and a person had been tasked with ensuring conformity with laws on "No Smoking" in public places according to 72.42% of hospital staff.

Healthcare professionals started smoking at a mean age of 18.10 ± 4.45 years. The average age of smokers is 39.94 (range 20-62). They smoked a mean of 11.12 ± 6.72 cigarettes daily. Their smoking habit has changed over the past 4 years as 21.19% of current smokers smoke fewer cigarettes every day, 48.34% smoke the same number and 30.46% smoke more. There was no change over time

Fig. 1. Hospital areas where healthcare professionals smoked at the three administrations.

	Patient room	Corridor	Public Toilet	Centre for Health Services Boooking	Infirmary	Refectory (P=0.002)	Dependents toilet (P=0.000)	Cash desk	Ambulatory (P=0.000)	Recreational Room (P=0.000)	Kitchen (P=0.000)	Administration (P=0.024)
2006	0.61	19.2	7.98	1.84	7.36	1.23	29.45	0.00	8.59	35.58	21.31	10.43
2011	0.62	8.70	21.74	2.48	4.97	8.07	16.15	1.86	1.86	15.53	15.53	13.66
2015	0.61	11.26	36.42	0.66	3.31	1.99	49.01	0.66	0.00	14.57	5.30	21.19

in the 45.10% of hospital workers who smoke inside the hospital (43.47% males; 56.53% females). Open-air areas like balconies, courtyards and entrances were preferred by 80.92%. In areas where smoking is forbidden 18.42% declared they found it hard not to smoke. 43.06% of healthcare professionals smoke while wearing their uniforms and 40.32% of them feel embarrassed doing it in front of patients or the general public while it made no difference to 59.68%. With regards to wanting to stop smoking, 12.58% said they were willing to try, 19.20% said they had never thought about it, 36.42% claimed they had often thought about it and 31.79% had thought about it sometimes. A majority of health care workers (56.86%) thought there was no effective method to stop smoking. Methods that were considered useful included group therapy (26.79%), pharmacological intervention (22.87%), training courses (19.60%) and penalties (7.18%).

Table II lists the estimated odds ratio when the dependent variable is "smoking at this time".

Gender, profession and operative unit are not significant in univariate model (not showed).

The univariate model showed the risk of being a smoker dropped significantly (p < 0.01) as age increased (OR = 0.97; 95% CI: 0.95-0.99) (Tab. II). A significant (p < 0.01) major risk factor in both models was not considering the behaviour of healthcare professionals as a model for patients (OR = 2.26; 95% CI: 1.49-3.43; adjusted OR = 1.99; 95% CI: 1.21-3.26). The risk of being a smoker was increased by not considering the smoking habit as the main cause of preventable deaths (OR = 2.25; 95% CI: 1.47-3.45). The strongest risk factor, which was significant in both models (p < 0.01), was being against the "No Smoking" law (OR = 18.90; 95% CI: 2.43-147.71; adjusted OR = 22.10; 95% CI: 1.85-264.78).

Interestingly, disagreeing with penalties emerged as a risk factor in the univariate analysis (OR = 2.40; 95% CI: 1.11-5.15) but lost significance and positivity when other co-variables were inserted. With regards to the attitudes of healthcare professionals when they saw colleagues smoking, the greatest risk of being a smoker emerged in individuals who said nothing (OR = 11.70; 95% CI: 6.12-22.37; adjusted OR = 10.64; 95% CI: 5.45-20.76) and in individual who walking away (OR = 3.23 95% CI: 1.51-6.91; adjusted OR = 3.27; 95% CI: 1.48-7.23), compared with individuals who suggested stopping.

Discussion

The main finding of the present study was that the prevalence of smokers is higher among healthcare professionals than among the general population in Italy. In Umbria 34.53% of the population are current smokers and 24.21% are former smokers compared with an Italian national prevalence of 20.80% smokers and 12.10% ex-smokers [2]. Even more remarkable is the lack of significant change over time. Many studies that analysed the smoking habit among doctors and hospital workers confirmed an approach was needed to reach the objective of eliminating smoking with health service buildings and provide greater support for professionals to stop smoking. [7-25]. Analysis of Umbria hospital data showed that in the past ten years the prevalence of smokers has not changed significantly (p = 0.257), remaining high in all three observation time-points. Consequently, not only has the "No Smoking" law been broken but it has had no effect on the smoking habit of healthcare professionals. One might argue, as others have, that the "No Smok-

Tab. II. Estimated under logistic regression models for the outcome to be smoker.

Explanatory variable	Cathegory variable	Univariate Logistic Imputed Model (Odds ratio)	Multivariate Logistic Imputed Model (Odds ratio)
Age		0.97 (0.95-0.99)**	0.98 (0.95-0.99)*
Behavioural model	Yes (ref)	-	-
	No	2.26 (1.49-3.43)**	1.99 (1.21-3.26)**
	Don't know	1.27 (0.64-2.49)	0.68 (0.29-1.60)
Tobacco use is the most preventable cause of death	Yes (ref)	-	-
	No	2.25 (1.47-3.45)**	1.86 (1.013-3.06)*
	Don't know	2.17 (1.25-3.76)**	1.54 (0.77-3.08)
Favour the law banning smoking in hospital	Yes (ref)	-	-
	No	18.90 (2.43-147.17)**	22.10 (1.85-264.78)**
	Don't know	3.64 (1.40-9.46)**	4.19 (1.25-13.97)*
Favour penalties for smokers in hospital	Yes (ref)	-	-
	No	2.40 (1.11-5.15)*	0.74 (0.28-1.96)
Attitudes towards smoker colleagues	Exhort to stop (ref)	-	-
	Make sanction	3.68 (0.30-43.80)	1.23 (0.04-33.64)
	Move him away	3.23 (1.51-6.91)**	3.27 (1.48-7.23)**
	Admonish	2.39 (0.58-9.88)	2. 19 (0.49-9.81)
	Move away	1.97 (0.94-4.09)	1.80 (0.85-3.80)
	Say nothing	11.70 (6.12-22.37)**	10.64 (5.45-20.76)**
Administration	2005 (ref)	-	-
	2011	1.10 (0.70-1.74)	1.02 (0.59-1.76)
	2015	1.00 (0.62-1.59)	0.98 (0.55-1.76)

Confidence interval in bracket is at 95% significant level. Significant level as follow * p < 0.05; ** p < 0.01

ing" law's main objective was to protect non-smokers from passive smoke because the damage it causes to the exposed population has long been known [26]. It was estimated in the USA that for every 8 smokers who die of smoking-related diseases, 1 non-smoker died of the effects of passive smoking [27]. Even though the "No Smoking" law in Italy did not impact upon the smoking habit in healthcare professionals, it did at least, in some cases, lead to a change in hospital areas that were used for smoking. In 2013 Principe R. observed that healthcare professionals had at least started smoking in open air areas and were smoking less in indoor areas. At all three observational time-points however, the present study found, as Figure 1 shows, that although fewer hospital workers were smoking in the community rooms, ward kitchens and hospital corridors, more were smoking in staff and public toilets and offices – despite the fact that 99.16% stated they understood the "No Smoking" law, 97.05% were aware of the damage passive smoking caused to health and 97.47% and 93.05%, respectively, knew that smoking was a major risk factor for cardiovascular and respiratory diseases. Since what the healthcare professionals knew about smoking-related health dam-

age and the "No Smoking" law did not impact upon their behaviour patterns the law alone was clearly not enough to ensure smoke-free hospitals.

Interestingly both univariate and multivariate analyses showed the risk of being a smoker increased in individuals who were opposed to the "No Smoking" law. Results were different for responses to penalties. In reply to the question "Do you agree with penalties for people who break the "No Smoking law?" divergent results emerged from the multivariate (adjusted OR = 0.75; 95% CI: 0.27-2.03) and univariate (OR = 2.40; 95% CI: 1.11-5.15) analyses. When estimated with other variables, the high risk of being a smoker in individuals who opposed the "No Smoking" law, and the risk of being a smoker, linked to a weak approval of sanctions, suggested that hospital staff supported the "No Smoking" law in hospitals in theory but preferred not to abide by it in their daily behaviour and not to pay a penalty for breaking the law. These data once again provided evidence that the "No Smoking" law in itself was not enough to make healthcare professionals stop smoking.

The risk of being a smoker was greater among hospital staff who did not think the behaviour of healthcare pro-

fessionals should constitute a model for the general population and staff who said nothing when they saw someone smoking in a No Smoking area. Interestingly, the average predicted probabilities (APP) indicated that 42% of healthcare professionals would be smokers if no one considered doctors as behaviour models and 56% would be if no one reacted upon seeing colleagues breaking the "No smoking" law. The "No Smoking" law has at least created a better working environment for non-smokers and never-smokers and has strengthened the chances of insisting the law be respected, even if they have not completely convinced smokers to uphold it.

In 2010 Callinan reported that the "No Smoking" law created an environment that reduced exposure to passive smoking and supported individuals that wanted to stop smoking [28]. Present data showed that 80.80% of the smokers who replied to the questionnaire had thought about stopping smoking at least once in their lives, 36.43% had thought about it often and 31.79% often. Interestingly, 12.58% were ready to stop smoking. The main problem that is necessary to face is the gap between the numbers of individuals that think about stopping smoking and those that actually do stop. In fact, this study confirms that, a "No Smoking" law alone had no significant effect on the smoking habit of healthcare professionals. It only created limited conditions that supported people who wanted to stop smoking and people who were victims of passive smoking but were unable to oppose to it.

Therefore the "No Smoking" law was neither efficacious nor efficient in promoting health and consequently "different strategies" need to be devised and assessed. In order to have smoke-free hospitals all key elements of the Ottawa Charter should be implemented: Build Healthy Public Policy, Create Supportive Environments, Strengthen Community Actions, Develop Personal Skills and re-orient health services [29]. This implemented in to the workplaces and applied to promote health in specific contexts and to solve "life style issues" like: smoking, low physical activity, stress and high calorie income, has been called Workplace Health Promotion (WHP) [30]. A methodology that the European Network for Workplace Health Promotion contributed to demonstrate to be effective, in particular on these last risk factors [31]. In fact, WHO in 2010, confirmed this approach by the publication "Healthy workplaces, a model for action: for employers, workers, policymakers and practitioners" [32].

Conclusions

Clearly, much remains to be done in promoting a health culture or, in this case, an anti-smoking culture among workers. At present, the main interventions have been on a legal and political basis. Little has been done on the other key aspects indicated in all models of good practice in WHP. For many years and in many countries no reference to health promotion/protection and workplace safety was found in any training courses for healthcare pro-

fessionals [30]. Intervening in this area should become a priority in order to create a health promoting culture because healthcare workers, particularly doctors, are the interface with the public in anti-smoking programmes. The Ottawa Charter upholds the workplace as a source of health for the population. No significant results will be achieved unless, starting with healthcare professionals, direct workplace interventions improves behaviour patterns and makes hospitals smoke-free. Targeted strategies such as an anti-smoking centre in every hospital, short consultation service and educational courses for health service personnel may be useful. It is worth noting that only 10.74% of responders knew that an anti-smoking centre existed in the hospital where they were working. Although the main objective of anti-smoking centres is to combat smoking, they are also involved in health campaigns aimed at raising awareness, educating, informing and training healthcare workers and the public and so could usefully become the nerve-centre for integrating diverse strategies. In conclusion, effective results will be achieved only by the implementation of a common strategy and shared intervention programmes that are agreed by all stakeholders: employers, workers, policymakers and practitioners. A stand alone law has been shown to be inadequate to solve deep-rooted behaviour pattern.

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Authors' contribution

All authors participated in the design, execution and data analysis.

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