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Attitudes, perceptions, and smoking behavior of university faculty and staff following the introduction of a comprehensive tobacco-free policy: a repeated cross-sectional survey in Lebanon

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Abstract

Background A growing body of research have evaluated the effect of university tobacco-free policies on faculty and staff, however, none of these studies has been carried out in the Eastern Mediterranean region. This study evaluates changes in faculty and staff attitudes, perceptions and smoking behavior, one year post-adoption of a tobacco-free policy in a medium-sized university in Lebanon and the region.

Methods Two cross-sectional surveys were conducted in 2017 and 2018: pre- and one year post-policy implementation. A random sample of 625 and 624 participants took part in the 2017 and 2018 studies respectively.

Results Faculty and staff had a positive attitude towards the policy at the two time points. The belief that there should be exceptions to the policy significantly decreased from 79% to 59% (p=0.002) among all smokers, particularly those with lower educational attainment (81% to 57%, p=0.007). Perception of compliance among peer smokers increased from 73% to 87% (p= 0.009). The proportion of smokers did not significantly change one year post-policy implementation, however, 44% of smokers with lower educational attainment, compared to only 7% of those with higher educational attainment (p< 0.001), reported a decrease in their smoking behavior outside campus.

Conclusion The policy had a positive effect on the attitude, behavior and perception of policy benefits among smokers with lower educational attainment, who constitute the majority of smokers. Studies tackling the effectiveness of university or workplace smoke-free policies are scarce in the Middle East. Findings from this study inform and support future efforts to develop university and workplace tobacco free policies.

1. Background

Tobacco, one of the major causes of mortality worldwide, accounts for the death of more than 8 million people yearly. Approximately 7 million of those deaths are attributed to direct tobacco use while around 1.2 million deaths result from the exposure of non-smokers to second hand smoke (SHS) (1). According to the International Labor Organization (ILO), exposure to second hand smoke at the workplace causes the death of 200,000 workers yearly (2). This is due to the fact that most working age people spend about a third of their day at work, making interventions in such settings effective in reducing the smoking burden (3).

In Lebanon, smoking is prohibited in all open public places, public transport, workplaces and outdoor areas of education, health and sports facilities. (4). However, the policy is not properly enforced and the smoking prevalence is still considered among the highest in the Eastern Mediterranean Region. More than 1,307,000 adults aged above 15 (37% men and 21% women) were daily smokers in 2015, with the highest proportions being between 40 and 69 years old (5, 6). Data on the exposure of adult non-smokers to second hand smoke is not available, however, according to the 2011 Global Youth Tobacco Survey

(GYTS), 70% of students aged 13 to 15 years old are exposed to second hand smoke at home and 65% are exposed to it outside home (7).

Tobacco-free workplaces, including tobacco free universities, have been effective in decreasing exposure to second hand smoke, reducing cigarette consumption, increasing smokers' intention to quit and increasing the likelihood of cessation (8–11). Non-smokers' exposure to secondhand smoke decreases by 28% in workplaces banning tobacco smoking (12). These policies are also associated with a 4% decrease in the total prevalence of tobacco consumption and 29% reduction in the total consumption per employee (8). Chapman et al. found that the number of daily smoked cigarettes decreases by 3.5 cigarettes per smoker in workplaces having these restrictions (13). Such workplaces not only provide a supportive environment for smokers willing to quit but also decrease the likelihood of initiation (14). They result in positive changes in the social norms associated with smoking which can disseminate to other environments such as employees' homes (15). The reduced smoking behavior results from the inconvenience of leaving the work area to smoke, from the image of being an addict getting nicotine fixes outside the workplace or from the reduction of smoking cues (as other colleagues are not witnessed smoking) (14). In addition to their effect on the smoking behavior, these policies increase productivity and decrease absenteeism rates as smokers miss more work days due to illness (16, 17).

Workers have generally shown support for smoking bans at workplace, although non-smokers have always had a more favorable attitude towards them. In college and university settings, compliance to tobacco free policies among staff and faculty members has been substantial and support has ranged between 64% and 76% (18). However, the effect of tobacco-free policies has been much dependent on their strength, meaning that comprehensive tobacco policies decreased smoking prevalence and cigarette consumption twice as much as partial bans (8). Demographic factors, such as workers' socioeconomic status (SES), represented by education, occupation and income, were also found associated with the effectiveness of the policy in reducing the smoking behavior as workers with higher SES have been reported to have higher quit attempts and cessation rates (19, 20, 21).

The American University of Beirut (AUB) is one of the largest employers in Lebanon with more than 5635 staff and faculty members. The university started its tobacco-free policy initiative in 2008 by banning smoking in all university buildings except faculty apartments. In January 2018, AUB adopted a comprehensive tobacco-free policy as instituted by national policy, although it was first Lebanese higher educational institution to do so. AUB Tobacco-free policy prohibits: smoking any kind of tobacco in all indoor and outdoor areas on campus and in university operated facilities off-campus, selling or promoting tobacco and tobacco-related products on university premises, and accepting research funds or event sponsorships from tobacco or tobacco-related companies. Signage, banners and large promotional cubes with messages about the tobacco-free policy were placed at all university gates, major buildings, halls, gathering places and on all AUB social media platforms and screens. Recycling receptacles were placed at all entry points to the university, which later on developed into a cigarette litter-recycling program. The recycled cigarette filters were used to form paddleboards. Free access to a smoking cessation program, including counseling sessions and nicotine replacement therapy, was also made

available for students, staff or faculty wishing to quit (22). More details on the policy can be found in Chaaya et al (23).

In this manuscript, we report specifically on the attitudes, perceptions and behavior changes amongst university faculty and staff one year post-adoption of the tobacco-free policy. To our knowledge, this is the first evaluation of the effectiveness of a tobacco-free policy on employees in the context of Lebanon and the region. We examine more closely differences in attitudes, perceptions and behaviors between smokers and non-smokers as well as by educational attainment of faculty and staff surveyed.

2. Methods

Study Design

This study is based on two repeated cross-sectional surveys. The first was conducted prior to the implementation of the smoke-free policy (2017) while the second was done one year after (2018). A sample of 1722 staff and 960 faculty members was randomly selected in each round. Faculty and staff were sent invitations by emails and were asked to access a survey link if they considered participating. To ensure participation of lower grade staff (who rarely use their email accounts), hard copies of the questionnaire were also placed for 2 weeks in the administration office of almost all departments. Completed surveys were deposited in a locked box. Where needed, a research assistant from the Faculty of Health Sciences was available to assist staff, wishing to participate, in filling the questionnaire. The response rate was around 23% in both years (625 participated in 2017 and 624 in 2018). The research protocol was approved by the Institutional Review Board at AUB. Participation was voluntary and data were kept anonymous.

Measures

The online 55-question survey took 5–7 min to complete. The questionnaire asked about demographic information, faculty and staff attitude towards the smoking policy, perceived benefits, and smoking behavior. To ensure appropriateness and clarity of the survey, pre-testing was done on a small number (n = 20) of staff and faculty members before invitations were sent.

Demographics

Information on gender, age, marital status, and number of children were collected. Participants were asked to identify their primary role (staff or faculty) and their educational attainment (primary, intermediate, technical, secondary, bachelor’s, master’s, and doctoral degrees).

Smoking behavior

Information on the smoking status, history, and frequency were collected. The smoking status, initially divided into four categories (non-smokers, ex-smokers, occasional smokers and regular smokers) was grouped into two: smokers (current) and non-smokers (never smoked, former and occasional smoker).

Participants, identifying themselves as smokers, were further asked if they considered themselves addicted, had concerns about the health effects of smoking, had intentions to quit, had made quit attempts, and considered participating in a cessation program. In addition, smokers had to report any changes (increase, decrease, remained the same) in smoking intensity post-policy implementation.

Attitude towards the smoking policy

Participants' attitude towards the policy was assessed by the extent of support, and the extent to which they believed that the university tobacco-free policy had created a healthy environment, and promoted quit attempts. In addition, they were asked whether there should be exceptions to the policy. All these responses were initially reported on a 3-point Likert scale (large extent, some extent, not at all, not sure) then dichotomized into Yes or No (large extent and some extent were considered Yes, while not at all and not sure were considered as No).

Perception of compliance and benefits

In this section, participants had to determine whether they perceive their peers as compliant or not compliant with the policy. They were also asked to determine the extent to which they perceive the following as policy benefits: reduction in smoking frequency, increase in faculty and staff productivity, decrease in rate of faculty and staff sick days, and decrease in rate of student absences. Responses were first reported on a 4-point Likert scale (not a benefit, minor benefit, moderate benefit, major benefit and don't know) then dichotomized into Yes or No (minor benefit, moderate benefit, and major benefit were considered Yes, while not a benefit and don't know were considered as No).

Statistical analysis

Based on their educational attainment, smokers were stratified into participants with lower educational attainment (< bachelor degree (BD)) and higher educational attainment (> BD). χ^2 tests were computed to determine differences in attitude, perceived compliance, and perceived policy benefits pre- and one year post-policy implementation among smokers and non-smokers. The same analysis was repeated on smokers stratified by educational attainment. Significant differences were identified at a p value < 0.05. All the statistical analyses were performed using the statistical software R version 3.4.1.

3. Results

Of the faculty and staff who were invited to participate, a larger proportion of females completed the questionnaire in the first cross-sectional survey compared to the follow up survey (56% compared to 49%). The distribution of participants by faculty and staff was similar in both years. The smoking status did not significantly vary with 18% and 21% of participants being smokers in 2017 and 2018 respectively (Table 1). When stratified by educational attainment, the proportion of smokers with higher educational attainment decreased from 41–35% one year post-policy implementation, yet the change was not statistically significant (Table 1).

Table 1
Characteristics of faculty and staff pre- and 1-year post policy implementation

	Year of survey implementation		
General Characteristics	Baseline 2017 (N = 625)	1-year post 2018 (N = 624)	P value
Gender (Female)	348 (56.1)	299 (48.9)	0.014
Age (mean(SD))	41.21 (11.53)	39.61 (11.50)	0.021
Type of respondent			0.183
Faculty	211 (33.8)	184 (30.1)	
Staff	414 (66.2)	428 (69.9)	
Education			< 0.001
Primary	26 (6.5)	46 (10.9)	
intermediate	54 (13.4)	72 (17.1)	
technical	26 (6.5)	36 (8.5)	
secondary	31 (7.7)	64 (15.2)	
bachelor	121 (30.1)	98 (23.2)	
master	141 (35.1)	98 (23.2)	
doctoral	3 (0.7)	8 (1.9)	
Smoking status			0.348
Non-smokers	496 (81.6)	486 (79.3)	
Smokers	112 (18.4)	127 (20.7)	
Faculty and staff who are smokers			0.417
with lower educational attainment	65 (59.1)	82 (65.1)	
With higher educational attainment	45 (40.9)	44 (34.9)	
N applicable for “faculty and staff who are smokers”: 112 for 2017 and 127 for 2018			

[Please insert Table 1 (additional file 1)]

3.1 Attitude towards the policy

Overall, participants had a positive attitude towards the tobacco-free policy with little changes between 2017 and 2018, and with a consistently and significantly higher proportion of non-smokers supporting it.

The proportion of smokers supporting the policy and believing that it had created a healthy environment positively changed with differences not being statistically significant. However, the proportion of smokers believing that there should be exceptions to the policy significantly decreased (from 79–59% ($p = 0.002$)), particularly among those with lower educational attainment (from 80–64% ($p = 0.007$)) (Table 2).

Table 2

Attitude pre- and 1-year post policy implementation by smoking status and educational attainment

	All participants			Among participants who are smokers		
	Non-smokers (NS)	Smokers (S)	P value (NS/S)	With lower educational attainment (< BD)	With higher educational attainment (≥ BD)	P value (< BD)/(≥ BD)
Support the policy						
Baseline	452 (91.5)	70 (66.0)	< 0.001	49 (81.7)	19 (43.2)	< 0.001
1-year post	459 (94.6)	93 (73.2)	< 0.001	65 (79.3)	27 (61.4)	0.051
P value (B/1YP)	0.071	0.294		0.888	0.135	
Think the policy has created a healthy environment						
Baseline	444 (90.1)	70 (66.0)	< 0.001	45 (76.3)	24 (53.3)	0.025
1-year post	438 (90.3)	96 (75.6)	< 0.001	64 (78.0)	31 (70.5)	0.467
P value (B/1YP)	0.982	0.145		0.964	0.149	
Think the policy has promoted quit attempts						
Baseline	352 (72.1)	56 (52.3)	< 0.001	42 (70.0)	13 (28.9)	< 0.001
1-year post	289 (59.5)	64 (50.4)	0.082	52 (63.4)	11 (25.0)	< 0.001
P value (B/1YP)	< 0.001	0.869		0.522	0.862	
Think there should be exceptions to the policy						
Baseline	220 (44.6)	82 (78.8)	< 0.001	46 (80.7)	36 (80.0)	0.999
1-year post	100 (20.6)	75 (59.1)	< 0.001	47 (57.3)	28 (63.6)	0.618
P value (B/1YP)	< 0.001	0.002		0.007	0.138	

* Percentages may not precisely reflect the figures as there were few missing values.

[Please insert Table 2 (additional file 1)]

3.2 Perception of compliance and benefits

Perception of policy benefits were reported more by non-smokers compared with smokers. In 2018, 78% of non-smoker participants believed that the policy had contributed to a reduction in the smoking frequency compared to 59% of smokers ($p < 0.001$). Similarly, more non-smokers thought that the policy had led to an increase in faculty and staff productivity (60% vs 43%, $p = 0.001$) and a decrease in their sickness (51% vs 36%, $p = 0.003$). Stratified by educational attainment, the perception of policy benefits was reported more by smokers with lower educational attainment. In 2018, 51% of smokers with less than a bachelor's degree compared to 27% of smokers with more than a bachelor's degree ($p = 0.016$) thought that the policy increased their productivity and 48% compared to 16% ($p = 0.001$) thought that the policy decreased their sickness. However, no significant changes were seen between 2017 and 2018 in both categories.

As for compliance, the proportion of smokers perceiving students and staff as compliant with the policy significantly increased between 2017 and 2018 (61–76% for students ($p = 0.021$) and 73–87% for staff ($p = 0.009$)). This change was particularly noticed among smokers with lower educational attainment (Table 3).

Table 3

Policy perceived benefits pre- and 1-year post implementation by smoking status and educational attainment

	All participants			Among participants who are smokers		
	Non-smokers (NS)	Smokers (S)	P value (NS/S)	With lower educational attainment (< BD)	With higher educational attainment (≥ BD)	P value (< BD)/(≥ BD)
Think the policy reduced smoking frequency						
Baseline	426 (86.6)	74 (69.8)	< 0.001	38 (63.3)	35 (77.8)	0.168
1-year post	375 (77.5)	75 (59.1)	< 0.001	49 (59.8)	26 (59.1)	0.999
P value (B/1YP)	< 0.001	0.117		0.797	0.095	
Think the policy decreased students absences						
Baseline	281 (57.5)	34 (33.3)	< 0.001	24 (43.6)	10 (22.2)	0.042
1-year post	207 (42.7)	38 (29.9)	0.012	32 (39.0)	6 (13.6)	0.006
P value (B/1YP)	< 0.001	0.682		0.718	0.436	
Think the policy increased faculty and staff productivity						
Baseline	306 (62.8)	48 (46.2)	0.002	28 (49.1)	20 (44.4)	0.787
1-year post	292 (60.2)	54 (42.5)	0.001	42 (51.2)	12 (27.3)	0.016
P value (B/1YP)	0.438	0.674		0.944	0.142	
Think the policy decreased faculty and staff sick days						
Baseline	327 (66.6)	41 (39.4)	< 0.001	30 (52.6)	11 (24.4)	0.007

* Percentages may not precisely reflect the figures as there were few missing values.

	All participants			Among participants who are smokers		
1-year post	249 (51.3)	46 (36.2)	0.003	39 (47.6)	7 (15.9)	0.001
P value (B/1YP)	< 0.001	0.716		0.678	0.46	
Think students are compliant						
Baseline	391 (79.6)	65 (61.3)	< 0.001	34 (55.7)	30 (68.2)	0.277
1-year post	372 (76.7)	96 (76.2)	0.998	66 (81.5)	30 (68.2)	0.144
P value (B/1YP)	0.302	0.021		0.002	0.999	
Think staff are compliant						
Baseline	414 (84.8)	79 (73.1)	0.006	41 (66.1)	37 (82.2)	0.103
1-year post	398 (82.1)	111 (87.4)	0.194	71 (86.6)	40 (90.9)	0.67
P value (B/1YP)	0.281	0.009		0.007	0.374	
Think faculty are compliant						
Baseline	407 (82.6)	75 (70.8)	0.008	40 (66.7)	35 (77.8)	0.304
1-year post	360 (74.5)	96 (75.6)	0.897	65 (79.3)	31 (70.5)	0.375
P value (B/1YP)	0.003	0.495		0.135	0.584	
* Percentages may not precisely reflect the figures as there were few missing values.						

[Please insert Table 3 (additional file 1)]

3.3 Smoking behavior change

Although the proportion of regular smokers was quite similar in both cross-sectional studies, the proportion of those with lower educational attainment was higher in both years (59% vs 41% in 2017 and 65% vs 35% in 2018). A decrease in the smoking behavior, though not statistically significant, was only noted among smokers with higher educational attainment. However, 44% of smokers with lower educational attainment reported a decrease in their off-campus smoking behavior compared to only 7% of those with higher educational attainment ($p < 0.001$). A small proportion of the smoking participants

joined the smoking cessation program at AUB and a high proportion (50% of those with lower and 36% of those with higher educational attainment) considered participating in such programs (Table 4).

Table 4
Smoking behavior pre- and 1-year post policy implementation by educational attainment

	Among participants who are smokers		
	With lower educational attainment (< BD)	With higher educational attainment (≥ BD)	P value
Thinking of quitting within the next 6 months			
Baseline	42 (65.6)	18 (40.0)	0.014
1-year post	49 (59.8)	18 (40.9)	0.067
P value (B/1YP)	0.58	0.999	
Consider participating in a smoking cessation program			
Baseline	36 (57.1)	21 (47.7)	0.445
1-year post	41 (50.0)	16 (36.4)	0.201
P value (B/1YP)	0.492	0.388	
Joined the smoking cessation program			
Baseline	NA	NA	
1-year post	5 (6.1)	2 (4.5)	0.663
P value (B/1YP)	-	-	
Decreased off-campus smoking behavior			
Baseline	NA	NA	
1-year post	36 (43.9)	3 (6.8)	< 0.001
P value (B/1YP)	-	-	
* Percentages may not precisely reflect the figures as there were few missing values.			

[Please insert Table 4 (additional file 1)]

4. Discussion

This manuscript reports on the change of attitude, perceived benefits and smoking behavior of staff and faculty one year post-implementation of a tobacco-free policy in a university in the Middle East. We found a significant effect of the policy on smokers, particularly those with lower educational attainment. Although the smoking prevalence did not significantly change, the policy had an effect on the smoking behavior as a large proportion of participants reported a decrease in their smoking frequency outside campus.

Consistent with many US studies, the majority of faculty and staff in both surveys had a positive attitude towards the policy with non-smokers always showing greater support and the proportion of smokers favoring such policy on campus significantly increasing post-policy implementation (18, 24–27). In the Eastern Mediterranean region, no previous research has compared the attitude of university faculty and staff pre- and post- policy implementation, however, they have shown similar results in terms of policy support and differences related to the smoking status (28, 29). The proportion of smokers with lower educational attainment believing that there should be exceptions to the policy significantly decreased one year post-policy implementation suggesting an improvement in the attitude of smokers known for being less likely to support such policies. Mamudu et al., in their study on employees in East Tennessee State University, reported a positive association between educational attainment and support for a tobacco-free policy (26). No previous studies have reported on changes in smokers' attitude towards such policies based on their educational level. Concerning the perception of policy benefits, no significant changes were seen among smokers pre- and post-policy implementation. However, looking at the 2018 results, the proportion of smokers with lower educational attainment believing that the policy increased their productivity and decreased their sickness was more than twice the proportion of those with higher educational attainment. This finding is significant and stresses the value of such policies in workplaces at national level. As for the perception of compliance, results were in line with previous studies showing that when the policy is properly enforced, compliance increases over time (30). The fact that the overall smoking prevalence did not significantly change one year post-policy implementation may be attributed to the pro-tobacco environment and the weak enforcement of the tobacco control law at the national level. However, the high proportion of smokers reporting a decrease in their smoking frequency outside campus suggests some effect of the policy on smoking behavior. These results are promising, as Lechner et al. reported in their study, assessing changes in smoking prevalence over four years post-implementation of a university tobacco-free policy, that the decrease was not significant until the second year, thus, illustrating the importance of examining changes over a longer period (9).

This study has some strengths as well as limitations. First, the pre- post- repeated cross-sectional design is suitable for evaluation. Second, the large sample size in both cross-sectional surveys gives power to the tests in detecting variations in attitude, perceived benefits and smoking behavior one year post-policy implementation. Third, this study adds to the literature gap in evaluations of university tobacco-free policies in countries outside the US (31). As for the limitations, the cross-sectional nature makes it hard to infer any causal association between the variables. In addition, a larger proportion of females responded in the first survey, however, this is not expected to change the results as we did not anticipate any change in attitude or smoking behavior by gender.

5. Conclusion

The policy had a positive effect on the attitude, behavior and perception of policy benefits among smokers with lower educational attainment, who constitute the majority of smokers. A growing number of universities in the region have evaluated the attitude of their constituencies towards tobacco free policies before implementation, however, none has studied the effect of such policies post-implementation. More evaluations of workplace and university tobacco free policies are needed to support and encourage the expansion of such policies across Lebanon and other countries in the region.

Abbreviations

American University of Beirut (AUB)

Bachelor degree (BD)

Global Youth Tobacco Survey (GYTS)

International Labor Organization (ILO)

Non-smokers (NS)

One year post (1YP)

Smokers (S)

Socioeconomic status (SES)

United States (US)

Declarations

Ethics approval and consent to participate

The research protocol was approved by the Institutional Review Board at AUB. An informed consent was obtained from all participants.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interest

The authors declare that they have no competing interests

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Authors' contributions

All authors came up with the original idea. MC was responsible for the study design and statistical analyses. DF, RN, and MC were responsible for the preparation of the manuscript. All authors contributed to the interpretation of results and also read and approved the final manuscript.

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