

Case Study.

The financial impact of cigarette smoke-free workplaces and public spaces project in the city of Yaoundé: analyses of compliance and financial effects across different venues

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Objectives: To evaluate the compliance with cigarette smoke-free regulation and to determine the financial effects on revenues of recreational and hospitality venues and public transport vehicles in Yaoundé, Cameroon.

Methods: Two cross-sectional before and after surveys were conducted in 458 workplaces and public spaces of Yaoundé. Statistic analysis examined frequencies and two-way tables with measures of association using Pearson chi² and Fisher's exact tests. Student paired t-test was used for comparing the mean before and after the project implementation.

Results: The compliance with cigarette smoke-free regulation was associated with no cigarette-smoking signage in many locations. The number of smoker's clients decreased while the number of non-smoker's clients increased significantly thereby cross-compensating and improving the overall volume of frequentation. The mean actual monthly revenues were significantly increased and the financial effects were positive for the majority of recreational, hospitality and public transport industries.

Conclusion: The compliance with cigarette smoke-free regulation was likely associated with no cigarette signage, but it alienated the smoker's clients and attracted non-smoker's clients. The overall volume of frequentation improved thereby increasing the actual monthly revenues. The findings of this paper diluted the economic concerns regarding the financial consequences of complying with cigarette smoke-free regulation in African cities.

Key words: Cigarette smoke-free policies, compliance, financial effects, workplaces and public spaces, Yaoundé, Cameroon.

Introduction

Exposure to second-hand cigarette-smoke is an important public health problem in many low and middle income countries where an estimated 33%-38% of children, 25%-35% of women, and 21%-24% of men are exposed to second-hand cigarette-smoke (Oberg *et al.*, 2011). In Cameroon, the number of people exposed to tobacco smoke evolved from 35.7% in 1994 to about 37% in 2010 (Njoumemei *et al.*, 2011; 2012). Scientific evidence has unequivocally established the harmful effects of exposure to second-hand cigarette smoke that significantly impacts on the lives of people at all ages. For non-smokers, breathing second-hand cigarette-smoke has immediate harmful effects on the cardiovascular system that can increase the risk for heart attack; and, non-smokers who are exposed to second-hand cigarette-smoke increase their heart disease risk by 25%-30% and their lung cancer risk by 20%-30%; while in children, exposure to second-hand

cigarette-smoke causes heart infections; more frequent and severe asthma attacks; respiratory symptoms and infections; and a greater risk for sudden infant death syndrome (CDC, 2006; Oberg *et al.*, 2011; WHO, 2011a). Second-hand cigarette-smoke exposure is responsible for the lost of 1,609,000 disability adjusted life-years (DALYs) and two-thirds of the lost DALYs are among children; whereas more women die compared to men due to effects of second-hand cigarette-smoke (Oberg *et al.*, 2011). Guidelines to Article 8 of the WHO Framework Convention on Tobacco Control (FCTC) state the effective measures to provide protection of people from the dangers of second-hand cigarette-smoke by requiring the total elimination of smoking and tobacco smoke in a particular space or environment in order to create a 100% smoke-free laws environment in indoor workplaces, public transport, indoor public places and, as appropriate, other public places (WHO,

2010b; FCTC Article 8.2). The public health rewards of cigarette smoke-free policies have been well established and substantiated empirically, and include a decrease in tobacco consumption and youth smoking initiation (Fichtenberg and Glantz 2002; WHO, 2011a).

While cigarette smoke-free policies are usually seen as a public health issue, there is a strong economic concern that cigarette smoke-free legislation would harm business of hospitality industries. Tobacco control through cigarette smoke-free policies is fought on economic grounds with arguments that a decrease in tobacco smoking would have detrimental economic consequences. The tobacco and hospitality industries usually oppose the cigarette smoke-free workplaces and public spaces by arguing that smokers would patronise hotels, bars and restaurants less frequently, and that the hospitality industry would decrease their turnover and would lose income, profits, jobs and customer satisfaction as a result of smoke-free policies (Bartosch and Pope 1999; Bartosch 2002). However, the international literature that met the following criteria - controlling for economic conditions that affect the hospitality industry; use of funding sources independent of the tobacco industry; publication subject to peer review; and measurement of actual events rather than predicted outcomes or assessments – found that the hospitality industries experienced no significant negative effects, and sometimes even experienced positive effects, after the cigarette smoke-free policies were implemented (Blecher 2006; Scollo *et al.*, 2003; Siegel 1992; Walbeek 2007).

Many African countries have nearly comprehensive cigarette smoke-free legislation and many others have exercised cigarette smoking restrictions through ministerial/communal decrees or executive notifications (Drope 2010, 2011). While a national cigarette smoke-free law protecting all the people in a country is ideal, cities can often pass cigarette smoke-free legislation sooner than countries. Many cities have every authority to pass comprehensive cigarette smoke-free laws to eliminate second-hand cigarette-smoke exposure through communal regulations that can be effective ways to address the issue with measures beyond the legal or political scope of national governments, and even to advocate or promote national cigarette smoke-free policies. A growing number of cities worldwide have banned cigarette smoking in enclosed public places including workplaces, health facilities, educational facilities, public transports, shopping malls, hotels, restaurants and bars (Dawson and Romo, 2009; WHO, 2011c; WHO, 2011d; WHO, 2012).

In 2009, the International Development Research Centre (IDRC) funded a pilot project entitled “tobacco smoke-free workplaces and public spaces in the city of Yaoundé” through the African Tobacco Situational Analysis (ATSA) initiative. The tobacco smoke-free project of the city of Yaoundé aimed at strengthening the implementation, compliance and enforcement of

tobacco smoke-free targeted workplaces and public spaces.

The tobacco control and cigarette smoke-free environment are ranked among the priorities for addressing both public health and development challenges. In 2005, the government of Cameroon signed and ratified the FCTC treaty that set out a number of measures that aim to protect people from the dangers of second-hand cigarette smoke in the country. While the nationwide tobacco control bill is not yet enacted; the cigarette smoke-free restrictions have exercised through several ministerial and communal decrees, decisions, service notes, or executive and administrative notifications (Njougmemi *et al.*, 2011). A growing number of ministerial and communal regulations have been enacted such as : (1) Decision No. 0222/D/MSP/SG/DMPHP of 8th November 1988 that bans tobacco smoking in all environments, institutions and buildings belong to the Ministry of Public Health ; (2) Law No. 98/004 of 14th April 1998 on Education Orientation in Cameroon: *Article 35 bans and prohibits tobacco use, consumption, smoking in the education sector*; (3) Decree No. 2005/440 Bis of 31st October 2006 ratified the FCTC; (4) Law No. 2006/018 of 29th December 2006 bans and prohibits all forms of advertising and sponsorship of tobacco products; (5) Service Note No. 1913 of 12th June 2007 of the Government Delegate of Yaoundé Urban Council bans and prohibits tobacco smoking in all enclosed urban environments, institutions and buildings; (6) Letter No. 07/788/CF/L/MINEFI/DRH/SP of 15th June 2007 bans and prohibits tobacco smoking in all institutions and buildings of the ministry of Economics and Finance; (7) Letter Circular No. 19/07MINESEC/SG/DRH/SDSS/APPS of 11th September 2007 bans and prohibits tobacco smoking in all educational environments, institutions and buildings.

However, research, which generates evidence for the support of cigarette smoke-free policies in the African cities, is limited. This paper set out to address the following two questions:

Is there an association between no cigarette-smoking signage in each of workplaces and public spaces and compliance with the cigarette smoke-free regulation in the city of Yaoundé?

Is the compliance with cigarette smoke-free regulation has any financial effects on the revenues of recreational and hospitality venues (bars, restaurants, hostels, hotels) and public transport vehicles (taxis, minibuses and buses) in the city of Yaoundé?

This information will allow policymakers; tobacco control advocates and the general public to understand better how the cigarette smoke-free policies at city and communal levels can be effectively exercised through several ministerial and communal decrees, decisions, service notes, or executive and administrative notifications.

Materials and Methods

Study design

This research employed an observational cross-sectional survey that was undertaken in two phases. Phase 1 consisted of a baseline evaluation before the beginning of the tobacco smoke-free project's implementation in each of the targeted workplaces and public spaces. Phase 2 concerned a final evaluation after the end of the tobacco smoke-free project's implementation in each of the same targeted workplaces and public spaces. The two phases of the study used the same structured and standardised questionnaire for face-to-face interviews with the same people and reviewed of reports and records' data from the same sources in each of the targeted workplaces and public spaces. The evaluation of the level of compliance with cigarette smoke-free regulation concerned all workplaces and public spaces while the evaluation of financial effects concerned only those workplaces and public spaces that were likely revenue generating venues or services. The revenue generating workplaces and public spaces included recreational and hospitality venues (bars, restaurants, hostels and hotels), commercial venues (supermarkets and shops) and public transport vehicles (taxis, minibuses and buses). Since the tobacco smoke-free project was executed by the Faculty of Medicine and Biomedical Sciences, the study was carried out by HEREG Stop Tobacco – an independent civil society's tobacco control unit of a research group working in Health Economics Research and Evaluation in Cameroon. The study was approved by the national ethics committee.

Study area/period

The study was conducted in the city of Yaoundé. Situated in the Centre Region of Cameroon, Yaoundé is the capital city with a population of about 3 million inhabitants. Yaoundé has a large migratory as well as youth population and is the educational hub for many regions and cities. Yaoundé has its own Urban Council led by a government delegate appointed by the president of Cameroon. The Yaoundé Urban Council covers seven municipalities which have the communal political or administrative powers. The cigarette smoke-free project of the city of Yaoundé covered the period of ten months from august 2009 to may 2010. The baseline evaluation before the project implementation was undertaken in July 2009 while the final evaluation after the project implementation was carried out in June 2010.

Study population, sample and sampling methods

The study population consisted of about 2,300 workplaces and public spaces of the city of Yaoundé. The sampling frame consisted of all workplaces and public spaces in the city of Yaoundé. However, the sample could not be selected randomly because a complete database of all Yaoundé Urban Council's workplaces and public spaces does not exist. The sampling strategy involved deliberate selection of about

20% of workplaces and public spaces from a wide range of sectors including health, education, transport, tourism and hospitality venues (hotels, bars, and restaurants), commerce (supermarkets), government and communal buildings. The basic sampling unit was the enclosed workplace or public space and the total sample of the study was 458 enclosed workplaces and public spaces. The selected workplaces and public spaces were from all seven communal municipalities within Yaoundé Urban Council territory. The types of workplaces and public spaces sampled included health facilities (health centres and hospitals), educational facilities (primary schools, secondary high schools, socio-educative centres, high education institutes and universities), recreational- entertainment – hospitality venues (bars, restaurants, hostels and hotels), public transport vehicles (taxis, minibuses and buses), retail shopping venues (supermarkets and shops) and indoor government and communal buildings (offices and meeting rooms including halls, stairs, lifts and toilettes). In different workplaces and public spaces, the people interviewed included chief nurses in charge and chief medical officers for health facilities; headmasters for educational institutions; owners or managers for bars, restaurants, hostels, hotels, supermarkets and shops; chief drivers for public transport vehicles; and chief administrators for indoor government and communal buildings.

Data collection, organisation and analysis

Data were collected through face-to-face interviews using a pre-coded structured and standardised questionnaire designed to assess the existence of no-smoking signage and the level of compliance to cigarette smoke-free regulation in all targeted workplaces and public spaces and to determine the financial effects of complying with cigarette smoke-free regulation. The quantitative data gathered from the interviews was cross-checked for accuracy with the review of reports and records on the days of visits during the data collection. Informed consent was obtained from all respondents to a structured questionnaire. Respondents did not receive any incentives to participate in both surveys. The same people were interviewed in both before and after surveys. To ensure that the same respondents were interviewed before and after the project, a control code including name, age, sex, location and venue of each respondent was created and kept after the before survey and used with discretion for controlling that he was the same respondent by trained interviewers during the final survey. In the health facilities, a chief nurse in charge was interviewed in each of health centres while the chief medical officer was interviewed in each of hospitals. In the educational facilities, a headmaster was interviewed for each of educational institutions. In the bars, restaurants, hostels, hotels, supermarkets and shops, an owner or a manager was interviewed in each of the venues. In the public transport vehicles, a chief driver was interviewed in each of vehicles. In the indoor government and

communal buildings, a chief administrator was interviewed in each of the buildings.

Before and after surveys framed the same issues and designed the same questions for addressing the objectives of the research. The socio-demographic characteristics of respondents included: gender/sex, age, education level, religion, professional status in the venue/service, cigarette smoking status. The professional status was captured by asking the following question: what is your professional status or work post in this workplace or public space? The response's modalities for this question included: chief nurse in charge, chief medical officer, headmaster, owner, manager, chief driver, chief administrator, other (specify). The subsequent questions with yes or no response's modalities were asked to assess many variables of the study. The cigarette smoking status: do you currently smoke cigarette? Have you smoked cigarette in the past? Knowledge of the dangers of smoking and second-hand smokes: do you know the dangers of smoking? Do you know the dangers of second-hand cigarette smokes? Are you aware of the Yaoundé city cigarette smoke-free regulation? The existence of signage prohibiting cigarette smoking and tobacco advertisement: are any no cigarette-smoking signs visible from the outside? Are any no cigarette-smoking signs on doors? Are any no cigarette-smoking signs visible inside? Are any signs with warnings of fines? Are any cigarette vendors or vending machines in the venues? Are any cigarettes on the menu of recreational and hospitality venues? Is there any cigarette advertising? The level of compliance with cigarette smoke-free regulation: is your workplace or public space complying with cigarette smoke-free regulation? A particular workplace or public space complied with cigarette smoke-free regulation if answers for the following three questions were yes: does anyone smoke cigarette inside your workplace or public space? During the last 30 days, did anyone smoke cigarette inside your workplace or public space? Is there any cigarette smoking visible in the venue? An additional question in relation to compliance with smoke-free regulation was the following: is there a no cigarette-smoking (restricted area) and smoking area in the venue? The impact of complying with cigarette smoke-free regulation on the volume of frequentation by non-smokers and smokers clients (applicable only for some income generating venues such as bars, restaurants, hostels, hotels, taxis, minibuses and buses): what is the volume of frequentation by smokers and non-smokers clients for the past 30 days (four weeks) representing a single ordinary month of business? The financial effects of complying with cigarette smoke-free regulation (applicable only for some income generating venues such as bars, restaurants, hostels, hotels, taxis, minibuses and buses) using the actual monthly level of revenues collected: what is the actual amount in CFA francs of revenues collected for the past 30 days (four weeks) representing a single ordinary month of business? The

average actual monthly level of revenues collected was used to judge the financial effects on recreational and hospitality venues and public transport vehicles.

The questionnaire was piloted and modified as necessary. Both evaluation surveys were carried out in French language. A group of 10 experienced interviewers were selected and trained in interview procedures and for conducting interviews in taking informed consent, administering the questionnaire, and reviewing reports and records. Quality assurance procedures were used to ensure consistency of interviewing and good quality data. Data quality was controlled in the field by supervisors. Verification checks were done on 10% of the sample.

The unit of analysis was the workplace or public space. The questionnaires were carefully examined for completion, coded and entered into the computer data base and analysed using Stata 10 software (Stata Corporation). The financial effects were measured by determining and comparing the actual amount of monthly revenues obtained orally from owners or managers and cross-checked on the site with data from the records of sales. Statistic analysis involved examining frequency distributions of variables and comparing different proportions and means. Pearson chi2 was used to compare the cigarette smoking status of respondents before and after the implementation of the cigarette smoke-free project. Two-way tables with measures of association between no cigarette-smoking signage and compliance with cigarette smoke-free regulation were employed using Fisher's exact test. The level of significance was set at $p=0.001$ for both Pearson chi2 and Fischer's exact tests. The Student paired t-test was used for comparing the average volume of frequentation of recreational and hospitality venues and public transport vehicles by non-smokers and smokers and to test the association between the financial effects and compliance to cigarette smoke-free regulation with the level of significance set at $p=0.0001$.

Study limitation

The study limitations were concerned with a pilot assessment using a cross-section design that covers some purposely selected and limited number of workplaces and public spaces across seven urban municipalities in the city of Yaoundé. While a total sample of 458 workplaces and public spaces were sampled in this study, the sample size within each urban municipality or type of workplace and public space was small so the ability to generalise results was limited. The collection of data before and after in different months may have some inherent bias. However, while the results need to be interpreted with cautious given the limitations highlighted, the findings still provided useful insights into the status of compliance with cigarette smoke-free workplaces and public spaces as well as the likely financial effects on recreational, hospitality venues and public transport vehicles in the city of Yaoundé.

Results

Socio-demographic characteristics of respondents and distribution of workplaces and public spaces in Yaoundé

A total of 458 respondents from the same number of workplaces and public spaces participated in the research. The response rate was 98.7% for the baseline evaluation survey before and 99.6% for the final evaluation survey after the project implementation. The 458 workplaces and public spaces were distributed as follows: 60 bars (13.1%), 45 restaurants (9.8%), 45 Taxis (9.8%), 42 minibuses (9.2%), 38 buses (8.3%), 10 hostels (2.2%), 15 hotels (3.3%), 25 supermarkets (5.5%), 25 primary schools (5.5%), 85 secondary schools (18.6%), 8 universities/high institutes (1.7%), 5 socio-educative centres (1.1%), 18 health centres (3.9%), 7 hospitals (1.5%), 10 government buildings (2.2%), and 20 communal buildings (4.4%). The secondary schools following by bars, restaurant and public transport vehicles were highly represented in the sample. The distribution of 458 respondents from different workplaces and public spaces was as follows: 18 chief nurses in charge (3.9%), 7 chief medical

officers (1.5%), 123 headmasters (26.9%), 155 owners/managers (33.8%), 125 chief drivers (27.3%), and 30 chief administrators (6.6%). Both owners/managers and chief drivers from which financial data were collected represented about 61.1% of respondents. Table 1 presents the socio-demographic characteristics and cigarette smoking status of respondents. About 7 out of 10 respondents were male. The majority of respondents (82.5%) were between the ages of 20 – 60 years with a mean age of 42.62 (± 3.28) years. The married respondents were in the majority (61.6%) while those unmarried constituted 20.5% and those divorced, separated and widowed represented 9.2%, 7.4% and 1.3% respectively. None of respondents was illiterate while more than half of respondents had a secondary level education and about one quarter of respondents had a high level education and less than one fifth had a primary level education. The majority of respondents (89.5%) were Christians (Catholics and Protestants) while Muslims and other faiths represented 5.7% and 4.8% respectively. Among the respondents, the current cigarette smokers were 43.9% before and 5.2% after the project implementation ($\chi^2 = 32.3835$; $p = 0.000$). The past cigarette smokers were 19.2% before and 57.9% after the project implementation ($\chi^2 = 79.3337$; $p = 0.000$).

Table 1: Socio-demographic characteristics and smoking status of respondents at workplaces and public spaces studied in Yaoundé

	N (%)
Sex	
Male	318 (69.4%)
Female	140 (30.6%)
Age	
Under 20 years	28 (6.1%)
20 – 40 years	112 (24.4%)
41 – 60 years	266 (58.1%)
61 years and more	52 (11.4%)
Marital status	
Married	282 (61.6%)
Unmarried	94 (20.5%)
Divorced	42 (9.2%)
Separated	34 (7.4%)
Widowed	6 (1.3%)
Education level	
Illiterate	0 (0.0%)
Primary school	82 (17.9%)
Secondary school	259 (56.6%)
High school	117 (25.5%)
Religion	
Catholic	182 (39.7%)
Protestant	228 (49.8%)
Muslim	26 (5.7%)
Others	22 (4.8%)

Table 1 continues

Smoking status:	Before the project	After the project
Do you currently smoke cigarette?		
Yes	201 (43.9%)	24 (5.2%)
No	257 (56.1%)	434 (94.8%)
	$\chi^2 = 32.3835, P = 0.000$	
Have you smoked cigarette in the past?		
Yes	88 (19.2%)	265 (57.9%)
No	370 (80.8%)	193 (42.1%)
	$\chi^2 = 79.3337, P = 0.000$	

No cigarette-smoking signage and level of compliance with cigarette smoke-free regulation in Yaoundé

The research focused on no cigarette-smoking signage and level of compliance with cigarette smoke-free regulation before and after the project implementation. Table 2 showed that the overall level of compliance with cigarette smoke-free enclosed workplaces and public spaces was significantly associated with no cigarette-smoking signage. Before the project implementation, 101 (22.1%) workplaces and public spaces had no cigarette-smoking signage and 82 (17.9%) workplaces and public spaces complied with cigarette smoke-free regulation ($p = 0.000$) while after the project implementation, 374 (81.7%) workplaces

and public spaces had no cigarette-smoking signage and 345 (75.3%) workplaces and public spaces complied with cigarette smoke-free regulation ($p = 0.000$). The association between no cigarette-smoking signage and level of compliance with cigarette smoke-free regulation varied by type of workplaces and public spaces. After the project's implementation, the association between no cigarette-smoking signage and level of compliance with cigarette smoke-free regulation significantly improved for bars, restaurants, hotels, primary schools, and secondary schools while it did not significantly improve for hostels, taxis, minibuses, buses, supermarkets, universities, socio-educative centres, health centres, hospitals, government and communal buildings.

Table 2: Comparison of no cigarette-smoking signage and level of compliance with cigarette smoke-free enclosed workplaces and public spaces before and after the project implementation

Workplaces and public spaces		Before the project (Baseline Evaluation Survey)			After the project (Final Evaluation Survey)		
		No cigarette-smoking signage	Level of compliance with cigarette smoke-free regulation	P-value (Fischer's exact test)	No cigarette-smoking signage	Level of compliance with cigarette smoke-free regulation	P-value (Fischer's exact test)
Bars(n=60)	Yes	2 (3.3%)	1 (1.7%)	0.033	40 (66.7%)	34 (56.7%)	0.000
	No	58 (96.7%)	59 (98.3%)		20 (33.3%)	26 (43.3%)	
Restaurants (n = 45)	Yes	3 (6.7%)	2 (4.4%)	0.003	32 (71.1%)	26 (57.8%)	0.000
	No	42 (93.7%)	43 (95.6%)		13 (28.9%)	19 (42.2%)	
Hostels (n = 10)	Yes	1 (10.0%)	1 (10.0%)	0.100	7 (70.0%)	5 (50.0%)	0.167
	No	9 (90.0%)	9 (90.0%)		3 (30.0%)	5 (50.0%)	
Hotels (n = 15)	Yes	2 (13.3%)	1 (6.7%)	0.133	9 (60.0%)	8 (53.3%)	0.001
	No	13 (86.7%)	14 (93.3%)		6 (40.0%)	7 (46.7%)	
Taxis (n = 45)	Yes	12 (26.7%)	11 (24.4%)	0.000	44 (97.8%)	43 (95.6%)	0.044
	No	33 (73.3%)	34 (75.6%)		1 (2.2%)	2 (4.4%)	
Minibuses (n = 42)	Yes	12 (28.6%)	10 (23.8%)	0.000	40 (95.2%)	39 (92.9%)	0.003
	No	30 (71.4%)	32 (76.2%)		2 (4.8%)	3 (7.1%)	
Buses (n = 38)	Yes	10 (26.3%)	9 (23.7%)	0.000	36 (94.7%)	35 (92.1%)	0.004
	No	28 (73.7%)	29 (76.3%)		2 (5.3%)	3 (7.9%)	
Supermarkets (n = 25)	Yes	12 (48.0%)	11 (44.0%)	0.000	22 (88.0%)	20 (80.0%)	0.004
	No	13 (52.0%)	14 (56.0%)		3 (12.0%)	5 (20.0%)	
Primary Schools (n = 25)	Yes	10 (40.0%)	8 (32.0%)	0.000	21 (84.0%)	20 (80.0%)	0.000
	No	15 (60.0%)	17 (68.0%)		4 (16.0%)	5 (20.0%)	
Secondary Schools (n = 85)	Yes	10 (11.8%)	4 (4.7%)	0.000	70 (82.4%)	67 (78.8%)	0.000
	No	75 (88.2%)	81 (95.3%)		15 (17.6%)	18 (21.2%)	
Universities (n = 8)	Yes	3 (37.5%)	2 (25.0%)	0.107	7 (87.5%)	6 (75.0%)	0.250
	No	5 (62.5%)	6 (75.0%)		1 (12.5%)	2 (25.0%)	
Socio-educative centres (n = 5)	Yes	1 (20.0%)	1 (20.0%)	0.200	3 (60.0%)	2 (40.0%)	0.400
	No	4 (80.0%)	4 (80.0%)		2 (40.0%)	3 (60.0%)	
Health Centres (n = 18)	Yes	6 (33.3%)	4 (22.2%)	0.005	14 (77.8%)	13 (72.2%)	0.002
	No	12 (66.7%)	14 (77.8%)		4 (22.2%)	5 (27.8%)	

Table 2 continues

Hospitals (n = 7)	Yes	5 (71.4%)	3 (42.9%)	0.429	4 (57.1%)	4 (57.1%)	0.029
	No	2 (28.6%)	4 (57.1%)		3 (42.9%)	3 (42.9%)	
Gvt Buildings (n = 10)	Yes	4 (40.0%)	4 (40.0%)	0.005	8 (80.0%)	7 (70.0%)	0.067
	No	6 (60.0%)	6 (60.0%)		2 (20.0%)	3 (30.0%)	
Cmnl Buildings (n = 20)	Yes	10 (50.0%)	8 (40.0%)	0.001	17 (85.0%)	16 (80.0%)	0.004
	No	10 (50.0%)	12 (60.0%)		3 (15.0%)	4 (20.0%)	
All venues (n = 458)	Yes	101 (22.1%)	82 (17.9%)	0.000	374 (81.7%)	345 (75.3%)	0.000
	No	357 (77.9%)	376 (82.1%)		84 (18.3%)	113 (24.7%)	

Our observations also showed that before the cigarette smoke-free project started there were few no cigarette-smoking signs visible only inside some workplaces and public spaces but after the project implementation, no cigarette-smoking signs were more present and visible from the outside, on doors and inside the majority of targeted workplaces and public spaces. Before the project implementation, there were not any no cigarette-smoking signs visible from the outside and on doors as well as any signs with warnings of fines or penalties in all targeted workplaces and public spaces. After the project implementation, the signs with warnings of fines or penalties were visible in 58/130 (44.6%) of recreational and hospitality venues (bars, restaurants, hostels and hotels), 90/123 (73.2%) of educational venues (schools, universities), 16/25 (64%) of health venues (health centres and hospitals), 38/125 (30.4%) of public transport vehicles (taxis, minibuses and buses), and 12/30 (40%) of public offices (government and communal buildings).

The designated no cigarette-smoking restricted areas and smoking areas were not available either before or after the project implementation in public offices, educational venues, health venues and public transport vehicles. Those designated no cigarette-smoking restricted areas and smoking areas were available in recreational and hospitality venues. Before the project implementation, 3/60 (5%) of bars, 5/45 (11.1%) of restaurants and 5/25 (20%) of hostels and hotels had the designated no cigarette-smoking restricted areas and smoking areas in their premises as compared to 26/60 (43.3%) of bars, 19/45 (42.2%) of restaurants, 12/25 (48%) of hostels and hotels after the project implementation. The recreational and hospitality venues that did not have designated no cigarette-smoking restricted areas and smoking areas were presumably completely cigarette smoke-free after the project implementation. The average occupancy rates of designated no cigarette-smoking restricted areas and smoking areas were 66% and 64% respectively across all recreational and hospitality venues before and after respectively.

Tobacco advertisement and sales were banned more after than before the project implementation. In the recreational and hospitality venues (bars, restaurants, hostels and hotels) the bans on tobacco advertisement and sales were implemented by 7/130 (5.4%) and

72/130 (55.4%) of venues before and after respectively. In the educational venues (schools, universities) the bans on tobacco advertisement and sales were implemented by 38/123 (30.9%) and 123 (100%) of venues before and after respectively. In the health venues (health centres and hospitals) the bans on tobacco advertisement and sales were implemented by 8/25 (32%) and 25 (100%) of venues before and after respectively. In public transport vehicles (taxis, minibuses and buses) the bans on tobacco advertisement and sales were implemented by 30/125 (24%) and 117/125 (93.6%) of vehicles before and after respectively. In the public offices (government and communal buildings) the bans on tobacco advertisement and sales were implemented by 12/30 (40%) and 30 (100%) of venues before and after respectively. Overall, in all workplaces and public spaces, the bans on tobacco advertisement and sales were implemented by 88/458 (19.2%) and 350/458 (76.4%) of venues before and after respectively.

Volume of frequentation by non-smokers and smokers clients of recreational and hospitality venues and public transport vehicles

The volume of frequentation by non-smoker's clients and smoker's clients evolved significantly in the same directions across different recreational and hospitality venues (bars, restaurants, hostels, hotels) and public transport vehicles. The comparison of the volume of frequentation before and after the project implementation using the monthly mean number of clients showed that the non-smoker's clients increased while the smoker's clients decreased in recreational and hospitality venues (bars, restaurants, hostels, hotels) and public transport vehicles (taxis, minibuses, buses) studied in Yaoundé as shown in Table 3. Overall, the mean number of non-smokers increased from 1,653 clients before to 2,031 clients after the cigarette smoke-free project implementation ($t = 24.5674$, $df = 254$, $p = 0.0000$) while the mean number of smokers decreased from 1,020 clients before to 918 clients after the project implementation ($t = 25.0301$, $df = 254$, $p = 0.0000$). The implementation of cigarette smoke-free regulation negatively impacted on recreational and hospitality venues and public transport vehicles by alienating their smoking clientele while the volume of frequentation by non-smoker's clients improved significantly.

Table 3: Comparison of the mean number of non-smokers and smokers clients before and after the project implementation in recreational and hospitality venues (bars, restaurants, hostels, hotels) and public transport vehicles studied in Yaoundé

Workplaces and public spaces (n)	Types of clients	Mean	Std. Dev.	t	df	P-value
Bars (60)	Non-smokers before	732	306.77	15.8775	59	0.0000
	Non-smokers after	968	399.70			
	Smokers before	435	182.74	16.6867	59	
	Smokers after	407	170.38			
Restaurants (45)	Non-smokers before	1,449	208.61	13.6754	44	0.0000
	Non-smokers after	1,780	260.76			
	Smokers before	886	127.66	46.0465	44	
	Smokers after	805	115.86			
Hostels (10)	Non-smokers before	467	71.35	5.0586	9	0.0000
	Non-smokers after	580	96.11			
	Smokers before	266	39.41	5.1667	9	
	Smokers after	260	39.55			
Hotels (15)	Non-smokers before	916	87.45	7.5316	14	0.0000
	Non-smokers after	1,104	143.67			
	Smokers before	569	64.97	6.7142	14	
	Smokers after	509	48.51			
Taxis (45)	Non-smokers before	1,209	224.28	32.1977	44	0.0000
	Non-smokers after	1,443	263.37			
	Smokers before	813	151.11	35.6312	44	
	Smokers after	672	124.54			
Minibuses (42)	Non-smokers before	2,021	540.45	21.1792	41	0.0000
	Non-smokers after	2,589	668.29			
	Smokers before	1,286	339.25	24.8581	41	
	Smokers after	1,123	300.26			
Buses (38)	Non-smokers before	4,072	666.20	24.9001	37	0.0000
	Non-smokers after	4,834	759.91			
	Smokers before	2,431	387.59	23.5490	37	
	Smokers after	2,262	370.08			
All venues (255)	Non-smokers before	1,653	1,174.26	24.5674	254	0.0000
	Non-smokers after	2,031	1,384.90			
	Smokers before	1,020	700.59	25.0301	254	
	Smokers after	918	652.34			

Financial effects on recreational and hospitality venues and public transport vehicles

The financial effects of complying with cigarette smoke-free workplaces and public spaces were judged by comparing the mean of actual monthly revenues of July 2009 before the project implementation with the ones of June 2010 after the project implementation. The comparison of the actual monthly revenues showed

that the mean monthly revenues were significantly different before and after the project implementation across different workplaces and public spaces as show in Table 4. Overall, the average actual monthly revenues increased from CFA francs 1,405,079 (Std. Dev. = 2,368,220) to CFA francs 1,602,106 (Std. Dev. = 2,676,155), ($t = 8.6271$, $df = 254$, $p = 0.0000$).

Table 4: Comparison of the mean monthly revenues before and after the project implementation in recreational and hospitality venues (bars, restaurants, hostels, hotels) and public transport vehicles in CFA Francs (1\$= 500 CFA Francs)

Workplaces and public spaces (n)	Actual Revenues	Mean	Std. Dev.	t	df	P-value
Bars (60)	Monthly revenues before	553,684	211,233	13.3159	59	0.0000
	Monthly revenues after	574,561	217,516			
Restaurants (45)	Monthly revenues before	978,847	150,866	14,2530	44	0.0000
	Monthly revenues after	1,046,136	159,983			
Hostels (10)	Monthly revenues before	2,322,786	824,110	10.3088	9	0.0000
	Monthly revenues after	3,586,445	1,206,281			
Hotels (15)	Monthly revenues before	10,400,000	1,145,541	30.3871	14	0.0000
	Monthly revenues after	11,600,000	1,288,577			
Taxis (45)	Monthly revenues before	272,894	63,936	5.6990	44	0.0000
	Monthly revenues after	307,621	91,915			
Minibuses (42)	Monthly revenues before	462,661	144,957	8.5674	41	0.0000
	Monthly revenues after	529,865	172,250			
Buses (38)	Monthly revenues before	1,837,136	629,088	17.4729	37	0.0000
	Monthly revenues after	2,122,138	727,538			
All venues (255)	Monthly revenues before	1,405,079	2,368,220	8.6271	254	0.0000
	Monthly revenues after	1,602,106	2,676,155			

The majority of study locations experienced increase in average monthly revenues. In the recreational venues, 11/60 (18.3%) of bars and 4/45 (8.9%) of restaurants reported no change in their revenues while 46/60 (76.7%) of bars and 37/45 (82.2%) of restaurants reported an increase in their revenues, and 3/45 (5%) of bars and 4/45 (8.9%) of restaurants reported a decrease in their revenues. In the hospitality venues, 2/10 (20%) of hostels and 1/15 (6.7%) of hotels reported no change in their revenues, while 7/10 (70%) of hostels and 13/15 (86.7%) of hotels reported an increase of their revenues, the remaining 1/10 (10%) of hostels and 1/15 (6.6%) of hotels reported a decrease in their revenues. In the public transport vehicles, 12/45 (26.7%) of taxis, 11/42 (26.2%) of minibuses and 8/38 (21.1 %) of buses reported no change in their revenues, while 29/45 (64.4%) of taxis, 28/42 (66.6%) of minibuses and 28/38 (73.7%) of buses reported an increase of their revenues, the remaining 4/45 (8.9%) of taxis, 3/42 (7.2%) of minibuses and 2/38 (5.2%) of buses reported a decrease in their revenues.

Discussion

The socio-demographic characteristics of respondents and the distribution of workplaces and public spaces were same before and after the project implementation. However, the cigarette smoking status of respondents did evolve significantly as the current cigarette smokers were reduced from 43.9% to 5.2 % of respondents while the past cigarette smokers increased from 19.2% to 57.9% of respondents. The number of past cigarette smokers among respondents increased because a substantial proportion (38.7%) of respondents who were current cigarette smokers before decided to quit cigarette smoking following the cigarette smoke-free project implementation thereby adding on the existing 19.2% of past cigarette smokers. This evolution of the cigarette smoking status among respondents

constitutes a first unexpected positive outcome of the cigarette smoke-free project in Yaoundé.

The overall level of compliance with cigarette smoke-free enclosed workplaces and public spaces was likely to be significantly associated with no cigarette-smoking signage. However, the association between no cigarette-smoking signage and level of compliance with cigarette smoke-free regulation did vary by type of workplaces and public spaces. After the project implementation, the association between no cigarette-smoking signage and level of compliance with cigarette smoke-free regulation significantly improved in some locations such as bars, restaurants, hotels, primary schools, and secondary schools. But the association between no cigarette-smoking signage and level of compliance with cigarette smoke-free regulation did not improve significantly in other locations such as hostels, taxis, minibuses, buses, supermarkets, universities, socio-educative centres, health centres, hospitals, government and communal buildings. This evidence suggests that in many African countries where the national tobacco control bill is not yet enacted; by emphasising the use of no-cigarette signage in specific workplaces and public spaces, the compliance with cigarette smoke-free regulation in the cities can be successfully exercised through several ministerial and communal decrees, decisions, service notes, or executive and administrative notifications. Many locally based regulations prohibiting cigarette smoking indoors by mayors and other city leaders can be effective ways to implement and enforce the compliance with cigarette smoke-free workplaces and public spaces thereby considerably reducing or eliminating the cigarette smoking exposure in the cities. This finding is in line with most other studies that investigated the exposure to cigarette smoke and smoke-free policies in developing countries (Drope 2010, 2011; WHO 2012). The international literature points out that a growing number of cities worldwide have successfully banned

cigarette smoking in enclosed public places including workplaces, health facilities, educational facilities, public transports, shopping malls, hotels, restaurants and bars (WHO, 2011c; WHO, 2011d).

However, in the absence of a national tobacco control bill, this Yaoundé pilot project to bring about cigarette smoke-free workplaces and public spaces relied on largely owners or managers' willingness and voluntary agreements to implement, comply and enforce the compliance with cigarette smoke-free enclosed environments in their premises. In this perspective, the adherence and acceptance of the voluntary cigarette smoke-free ministerial or communal regulations were based on the provision of good knowledge and awareness of health dangers, strong advocacies for effective cigarette smoke-free environment, and the existence of administrative or communal decision stating that those who control or manage the targeted premises can incur penalties where cigarette smoking violation occur and the actual amount of penalties that can be levied were set out in the communal decision. The extent of cigarette smoke-free workplaces and public spaces was largely discussed and agreed with owners and managers before the implementation of the project. There was a restriction on any form of cigarette smoking inside any targeted workplace and public space in the city of Yaoundé. But at the end of the project, a relatively good proportion of recreational and hospitality venues which did not fully comply with cigarette smoke-free regulation in their premises requested for some explicit exemptions that permit cigarette smoking indoors. In this regard 26/60 (43.3%) of bars, 19/45 (42.2%) of restaurants, 5/10 (50%) of hostels and 7/15 (46.7%) of hotels were concerned by the designated non-smoking areas and smoking areas in their premises.

Data in Table 3 demonstrated that the feared negative impact on smoker's clients did emerge as the comparison of the average monthly number of smoker's clients of July 2009 (before the project implementation) and June 2010 (after the project implementation) showed a significant decrease in every workplace and public space under the study. This finding is in line with the fears of both tobacco and hospitality industries who usually oppose the cigarette smoke-free workplaces and public spaces by arguing that smokers would patronise hotels, bars and restaurants less frequently (Bartosch and Pope 1999; Bartosch 2002). However, the average monthly number of non-smoker's clients increased significantly in between before and after the project implementation. Therefore, the negative impact of alienating smoker's clients was likely minimised by the significant increase in the average monthly number of non-smoker's clients in different workplaces and public spaces. This evidence suggests that while the compliance with cigarette smoke-free regulation alienated the smoker's clients, this negative impact was likely cross-compensated by the significant increase of non-smoker's clients across different recreation and

hospitality venues (bars, restaurants, hostels and hotels) and public transport vehicles (taxis, minibuses and buses). This challenges the tobacco and hospitality industries arguments against the cigarette smoke-free workplaces and public spaces on the ground of the negative impact on the overall volume of frequentation by (smokers and non-smokers) clients.

The overall financial effects showed that the mean actual monthly revenues were significantly increased in between before and after the project implementation in the majority of workplaces and public spaces (see Table 4). This evidence suggests that the compliance with cigarette smoke-free local regulations did not negatively and significantly affect the revenues of bars, restaurants, hostels, hotels, taxis, minibuses and buses in the city of Yaoundé. This finding challenges the pro tobacco and hospitality industries arguments that the hospitality industry would decrease their turnover and would lose income, profits, jobs and customer satisfaction as a result of cigarette smoke-free policies (Bartosch and Pope 1999; Bartosch 2002). Indeed, the comprehensive cigarette smoking bans have not impacted negatively on recreational, and hospitality venues and public transport vehicles while they are likely to have caused an increase of actual revenues in different locations. This finding is consistent with most other studies that found that the recreational and hospitality industries experienced no significant negative effects, and sometimes even experienced positive effects, after the smoke-free policies were implemented (Blecher 2006; Scollo *et al.*, 2003; Siegel 1992; Walbeek 2007). In contrast, the finding of this paper contributes to challenge the pro tobacco industry's arguments that there is a strong economic concern that cigarette smoke-free legislation would harm business of hospitality industries. In this perspective, tobacco control through cigarette smoke-free policies should not longer be fought on economic grounds with arguments that the compliance with cigarette smoke-free regulation would have detrimental financial consequences.

The findings of this study show that the comprehensive cigarette smoke-free workplaces and public spaces consistent with FCTC Article 8 have proven to be an effective means that can reduce considerably the exposure to second-hand cigarette smoke when properly implemented and enforced at city or communal level thereby even anticipating or promoting national cigarette smoke-free policies. The evidence shows that having a national tobacco control bill enacted is not an absolute requirement before starting the implementation of cigarette smoke-free policies at sub national and communal levels. The cigarette smoke-free restrictions can be effectively exercised through several ministerial and communal decrees, decisions, service notes, or executive and administrative notifications. Although this project has taken steps towards engaging Yaoundé in the process of becoming

cigarette smoke-free city but not all of the workplace and public spaces have yet accomplished the goal of becoming a cigarette smoke-free environment. However, this pilot project provided the evidence-based lessons learnt in relation to political and administrative commitments for local action towards cigarette smoke-free environment for city's citizens. The evidence of this project shed light on the role of civil society organisations in urging mayors, sub divisional and divisional officers and other city leaders to take action, advocating them to build effective partnerships and to conduct evidence-based awareness campaigns that ease the implementation, enforcement and maximise the compliance with cigarette smoke-free policies. The evidence also suggests that the compliance with cigarette smoke-free policies did not systematically harm business of the recreational and hospitality venues and public transport vehicles in the city of Yaoundé. Overall, to address the likely existing barriers and to succeed with local cigarette smoke-free regulation, lessons learnt from this project can be used by municipalities and other local authorities to ensure that the ban on cigarette smoking in workplaces and public spaces is addressed in line with national tobacco control policies that integrate all other measures recommended by the FCTC.

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