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Cigarette Smokers' Profile in Lebanese Adults

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ABSTRACT

Background: The objective of this study was to describe cigarette smoking prevalence among adults in Lebanon and to evaluate the profile of light cigarette smokers compared to never and heavy smokers.

Methods: Data were taken from a cross-sectional study carried out from October 2009 to September 2010, using a multistage cluster sampling all over Lebanon. Lebanese residents aged 40 years and above were enrolled in the study with no exclusion criteria. After an oral informed consent, subjects answered a questionnaire, including detailed smoking history and cigarette dependence. SPSS version 17.0 was used for data analysis.

Results: Out of 2201 individuals, 1320 (60.0%) had ever smoked cigarettes, out of whom 10.1% were light cigarette smokers. The adjusted odds ratio estimate of cigarette smoking was 3.08 for males compared to females ($P<0.001$), 1.13 for lower education ($P=0.016$), 1.87 and 3.12 for retired and jobless compared to working ($P=0.001$ and $P<0.001$) respectively, 1.17 for older age ($P<0.001$), 1.68 for presence versus absence of a family history of chronic respiratory disease ($P<0.001$), and 5.27 and 1.99 for presence compared to absence of at least one smoker at home ($P<0.001$) and at work ($P<0.001$) respectively.

Conclusion: This is the first epidemiological study in Lebanon that determined cigarette smoking prevalence at the national level. In Lebanon, males of the older generation seem to have higher smoking prevalence and dosing.

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Introduction

Tobacco consumption is considered by the World Health Organization (WHO) as one of the most urgent epidemics to tackle as it is responsible for consistent deaths in the world from non-communicable diseases due to smoking¹. The wave of controlling this epidemic by the implemented laws is spreading in a consistent way but not as fast as it is predicted especially in developing countries¹. Lebanon, which joined the WHO Framework Convention on Tobacco Control in 2005 is now facing the third step in this wave consistent in banning smoking in public places, to be implemented starting September 3rd 2012². Few data exist on the smoking habits in Lebanon although known to be the heaviest consumer of tobacco in the Middle East³. In fact, few publications addressed the prevalence of smoking on a national level but rather were focused on special populations^{3,4}.

From a previous publication about a cross-sectional study using a multistage cluster sample all over Lebanon⁵, we depicted out of 2201 individuals, 1320 (60.0%) were ever smokers. Since no data existed about cigarette smokers' profiles in Lebanon, especially for the profile difference between light smokers, never smokers and heavy smokers, and since many

challenges might encounter the implementation of the new ban, this study was conducted in order to describe smoking prevalence in Lebanon, and to evaluate the profile of light cigarette smokers in comparison with never and heavy smokers.

Methods

Data for this analysis was taken from a cross-sectional study carried out from October 2009 to September 2010 all over Lebanon using a multistage cluster sampling method.

Among the totality of villages, towns and cities in Lebanon (geographical units), we randomly selected one hundred units where a representative of local authorities provided us with a list of dwellers. We then randomly selected individuals to be interviewed from the list; randomization was performed on computer software. Lebanese residents aged 40 years and above were enrolled in the study with no exclusion criteria.

After an oral informed consent, subjects had pre-bronchodilator and post-bronchodilator spirometric measurements in the presence of a trained technician and filled out a questionnaire. The questionnaire included sections about sociodemographic characteristics, respiratory diseases and symp-

toms, and a thorough smoking history evaluation. Moreover, carbon monoxide level was measured in exhaled air using a CO – Tester- NG, F.I.M. Further methodological details for this study are available in another publication⁵.

Individuals were considered light smokers if they consumed equal to or less than five cigarettes/day for more than two years^{6,7}, in comparison with heavy smokers (if they smoked more than five cigarettes/day for more than two years during lifetime). Moreover, cigarette dependence was defined using the Fagerström Test for Nicotine Dependence (FTND)^{8,9}.

SPSS version 17.0 was used for data analysis. Weighting was performed for sample representativity adjustment: coefficients were given for every individual, according to the numbers published by the Lebanese Central Administration of Statistics in 2007¹⁰; these coefficients took into account gender, age and dwelling region distribution and permitted to have a sample structure similar to that of the Lebanese population. Cluster effect was also taken into account to calculate confidence intervals, according to Rumeau-Rouquette et al¹¹, since individuals were taken in clusters from Lebanese villages and cities.

A *P* value of less than 0.05 was considered significant; however, a Bonferoni adjustment was applied in case of multiple comparisons. The Chi square test was used for cross tabulation of qualitative variables. Odds ratio (OR) estimates were calculated to assess the association between the dependent and the independent variables. Student test was used to compare quantitative variables means between two groups. Backward stepwise likelihood ratio logistic regressions were performed for multivariate analyses with heavy cigarette smoking and any cigarette smoking subsequently taken as the dependent variables, and socio-demographic characteristics as the independent variables after ensuring model adequacy to data by Hosmer-Lemeshow test in order to estimate adjusted OR.

Results

Out of 2201 individuals, 1320 (60.0%) were ever smokers. Never smokers had a carbon monoxide mean level of 8.02(SD=4.35) while current smokers had a mean level of 26.86 (SD=14.25) ($P<0.001$). One hundred and thirty three (10.1%) of cigarette smokers were light smokers and 1186 (89.9%) were heavy smokers. The status of one smoker was unknown. Light smokers had a carbon monoxide (CO) mean level of 16.68 (SD=14.17) compared with 21.97 (SD=14.78) among heavy smokers ($P=0.003$).

In Table 1, we present differences of sociodemographic characteristics between cigarette smokers and never smokers on one hand, and between low and heavy cigarette smokers on the other. Cigarette smokers were mostly males, of older age, had low to intermediate education level, currently retired or jobless ($P<0.001$). Compared with light cigarette smokers, heavy cigarette smokers were older ($P<0.001$) and jobless ($P=0.026$); there were no significant differences regarding other factors (Table 1).

As shown in Table 2, water-pipe smoking was common among both smokers (15.9%) and nonsmokers (16.9%) ($P=0.532$). However, mixed water-pipe smoking was significantly higher among light cigarette smokers (24.8%) versus heavy smokers (14.8%) ($P=0.003$). Those who had ever smoked presented higher odds of having a smoker in the family

or at work ($P<0.001$). Compared with heavy cigarette smokers, light smokers had less smokers in their family ($P=0.016$) and similar number of smokers at work place ($P=0.838$).

Table 1: Distribution of socio-demographic characteristics among low and heavy cigarette smokers

Characteristics	Smoking Status		<i>P</i> value	Level of smoking		<i>P</i> value
	Never N=882	Ever N=1320		Light N=133	Heavy N=1187	
Gender			<0.001			0.649
Male	321	744		72	672	
Female	559	575		60	515	
Age group (yr)			<0.001			0.015
40-44	217	205		31	174	
45-50	168	175		18	157	
50-54	120	196		22	174	
55-59	102	191		24	167	
60-64	90	184		15	170	
≥ 65	185	369		23	345	
Marital status			0.050			0.907
Married	700	1086		110	976	
Single	86	127		13	115	
Widow or divorced	87	92		8	84	
Education level			<0.001			0.219
Illiterate	86	61		6	55	
Primary school	153	277		23	254	
Secondary school	162	301		29	272	
High school	188	386		35	351	
Academic education	283	283		39	244	
Occupational status			<0.001			0.026
working	470	657		78	579	
Retired	89	232		24	207	
Jobless	321	431		30	400	

In current smokers, there were significant differences in dependence profile of both types of smokers (Table 3). Heavy cigarette smokers showed higher rates for all items of cigarette dependence, while light cigarette smokers had the opposite dependence profile. Moreover, compared to light smokers, heavy smokers declared smoking more frequently for any reason; however, there was no significant difference in smoking to avoid eating between both types of smokers (Table 4). In summary, light smokers had a mean Fagerström Test for Nicotine Dependence of 3.40 (SD=2.44) compared with 5.66 (SD=2.58) for heavy smokers ($P<0.001$).

In Table 5, we present the logistic regression for correlates of cigarette smoking and for heavy cigarette smoking. Statistically significant correlates of cigarette smoking included male gender, jobless and retirement, older age, lower education, having a family history of chronic respiratory disease, and having at least one smoker at home and at work (Table 5). Among cigarette smokers, only male gender, older age and having at least one smoker at home were positive correlates of heavy smoking. The rest of the factors do not significantly affect smoking rate in cigarette smokers (Table 5).

Table 2: Predisposing factors of low and heavy cigarette smokers

Variables	Smoking status		OR (95% CI)	P value	Level of smoking		OR (95% CI)	P value
	Never N=882	Ever N=1320			Light N=133	Heavy N=1186		
Water pipe smoking								
No	732	1110	1.00		100	1010	1.00	
Yes	149	210	0.93 (0.74, 1.17)	0.532	33	176	0.53 (0.35, 0.81)	0.003
Presence of chronic respiratory disease in family								
No	718	1034	1.00		106	928	1.00	
Yes	163	285	1.21 (0.98, 1.51)	0.076	26	259	1.14 (0.73, 1.79)	0.574
Presence of smoker among family members								
No	517	315	1.00		43	272	1.00	
Yes	365	1004	4.52 (3.76, 5.43)	<0.001	90	914	1.61 (1.09, 2.37)	0.016
Presence of smoker among colleagues								
No	780	1002	1.00		100	902	1.00	
Yes	101	318	2.45 (1.92, 3.12)	<0.001	33	285	0.96 (0.63, 1.45)	0.838

Table 3: Dependence profile characteristics of low and heavy current smokers

Characteristic	Light smokers		Heavy smokers		P value
	N=94	Percent	N=730	Percent	
Generally smokes alone					<0.001
Always	29	31.4	280	38.4	
Usually	22	23.3	204	27.9	
Sometimes	24	25.6	212	29.0	
Never	19	19.8	34	4.7	
Time of smoking after waking up (min)					<0.001
5	13	14.3	300	41.1	
6-30	36	38.1	261	35.8	
31-60	15	15.9	77	10.5	
>60	30	31.7	92	12.6	
Intensity of annoying if smoking is forbidden					<0.001
Severe	13	13.6	228	31.3	
Moderate	5	5.7	129	17.7	
Mild	14	14.8	162	22.2	
Never	62	65.9	210	28.8	
Which cigarette is mostly difficult to give up					0.009
Certainly, the first one in the morning	40	42.6	458	62.8	
Probably, the first one in the morning	9	9.8	60	8.2	
Maybe the first one in the morning	4	5.0	37	5.0	
Any other cigarette	40	42.6	175	24.0	
Continuing smoking even if become ill					<0.001
Certainly	22	23.8	168	23.0	
Probably	15	16.3	202	27.6	
Maybe	21	22.5	228	31.3	
Never	35	37.5	131	18.0	
Days spent without smoking					<0.001
≤1	9	10.1	158	21.7	
2-3	3	3.4	84	15.6	
4-7	8	9.0	183	25.1	
>7	73	77.5	275	37.6	
Stopped smoking for >7 days					<0.001
Never	28	29.9	529	72.5	
Once	14	14.9	82	11.3	
Several times	12	12.6	38	5.2	
Always	40	42.5	80	11.0	
Leaves family to search for cigarettes					<0.001
Certainly	27	28.2	377	51.7	
Probably	12	12.9	147	20.1	
Maybe	36	38.8	174	23.9	
Never	19	20.0	31	4.3	
Time spent to search for cigarettes					<0.001
Less than 1hour	53	56.2	147	20.1	
0.5-2 hours	12	12.4	59	8.1	
Half a day	7	7.9	142	19.5	
≥1day	22	23.6	382	52.3	
Percent of income spent for cigarettes					<0.001
1%	67	71.1	295	40.4	
2-10%	8	8.9	97	13.3	
10-50%	9	10.0	81	11.1	
>50%	9	10.0	257	35.3	
Preference of smoking to other activity					0.083
Certainly	8	9.1	62	8.5	
Probably	1	1.5	66	9.0	
Maybe	16	16.7	165	22.6	
Never	68	72.7	437	59.9	
Preference of smoking to eating					<0.001
Certainly	1	1.3	66	9.1	
Probably	2	2.6	50	6.9	
Maybe	18	19.2	248	34.0	
Never	73	76.9	365	50.0	

Table 4: Distribution of the reasons for smoking among light and heavy smokers

Reasons	Light smokers		Heavy smokers		P value
	N=94	Percent	N=730	Percent	
Smokes cigarettes by habit					<0.001
Certainly	32	34.4	530	72.6	
Probably	6	6.5	69	9.5	
Maybe	0	0.0	27	3.7	
Never	56	59.1	104	14.3	
Smokes cigarettes to concentrate					<0.001
Certainly	5	5.4	223	30.6	
Probably	10	10.8	57	7.8	
Maybe	0	0.0	25	3.4	
Never	79	83.9	424	58.1	
Smokes cigarettes for conviviality					0.001
Certainly	18	19.4	293	40.1	
Probably	8	8.6	71	9.7	
Maybe	6	6.5	31	4.3	
Never	62	65.6	335	45.9	
Smokes to increase morale					<0.001
Certainly	7	7.5	279	38.2	
Probably	3	3.2	39	5.4	
Maybe	4	4.3	27	3.7	
Never	80	84.9	385	52.7	
Smokes cigarettes for pleasure					<0.001
Certainly	21	22.8	395	54.0	
Probably	7	7.6	46	6.3	
Maybe	6	6.5	17	2.3	
Never	59	63.0	272	37.3	
Smokes to avoid eating					0.912
Certainly	7	7.4	61	8.4	
Probably	4	4.3	27	3.7	
Maybe	3	3.2	33	4.5	
Never	80	85.1	609	83.4	
Smokes to decrease nervousness					<0.001
Certainly	29	30.9	404	55.4	
Probably	6	6.4	59	8.1	
Maybe	2	2.1	20	2.7	
Never	57	60.6	247	33.8	

Table 5: Odds ratio (OR) estimates cigarette smoking adjusted for all other variables in the table using multivariate logistic regression analysis

Variables	Adjusted OR	95% CI	P value
Smokers over nonsmokers			
Male/Female	3.08	2.35, 4.03	<0.001
Single/Married	1.38	0.97, 1.96	0.075
Widow or divorced/Married	0.71	0.49, 1.04	0.077
Lower education versus higher education	1.13	1.02, 1.25	0.016
Retired/ working	1.87	1.30, 2.70	0.001
Jobless/ working	3.12	1.52, 4.67	<0.001
Older age/ younger age	1.17	1.09, 1.26	<0.001
Presence of chronic respiratory disease in family	1.68	1.29, 2.19	<0.001
Presence of at least one smoker at home	5.27	4.25, 6.55	<0.001
Presence of at least one smoker at work	1.99	1.44, 2.73	<0.001
Heavy smokers over light smokers			
Male/Female	1.63	1.04, 2.55	0.033
Older age/Younger age	1.23	1.09, 1.38	0.001
Presence of at least one smoker at home	1.65	1.09, 2.48	0.017

Discussion

This is the first epidemiological study in Lebanon adults aged 40 yr and above that determined smoking prevalence at the national level and described cigarette smoking profile. We found a high level of ever cigarette smoking (60%), the majority of them being heavy smoking individuals (90%), while 10% were considered light cigarette smokers. The Lebanese population seems to comprise lower proportions of light cigarette smokers versus the American one (15%)¹², but comparable to the Australian one (8.2%)¹³.

Cigarette smoking was found to be higher in males with lower education level, not working, older individuals. Similar to our findings, younger age and female gender were also found to be more common in light smokers of Australia¹³, and western Iran¹⁴. The influence of gender and socioeconomic

status (reflected here by education level and professional status) on smoking in general and heavy smoking in particular, is more and more established¹⁵. Thus, awareness and health promotion activities related to smoking hazards that are carried out by Lebanese authorities and nongovernmental organizations seem to give better results among younger female individuals.

Other factors that may affect cigarette smoking and its rate include pricing, peer smoking and parental monitoring during adolescence¹⁶⁻¹⁸; although these factors were not specifically tackled because our population was aged more than forty, having smokers at home and at work were found to be associated with higher smoking. Similarly, having smokers at home was a correlate of heavy versus light smoking; moreover, heavy smokers declared smoking for conviviality more often than cigarette light smokers. This goes in favor of other researchers

findings: Shiffman et al. found that light cigarette smokers were not social smokers^{6,19}, while Presson et al. found that light cigarette smokers had lower numbers of smokers in their families²⁰.

Heavy smokers showed in our study higher prevalence of all the nicotine dependence items ($P < 0.001$) in comparison with light smokers (positive reinforcement, negative reinforcement and craving). This is consistent with the fact that heavy smoking is known to be linked to dependence in a significant proportion of individuals²¹. However, tobacco consumers may never become tobacco dependent, this subgroup constitute the 'cigarette chippers' or 'very light smokers'^{6,22} or intermittent smokers²³. Studies showed that they do not differ from regular smokers in terms of smoking topography (e.g. puff number and duration) and post-smoking circulating nicotine levels^{24,25}, although they cannot maintain substantial plasma nicotine levels between cigarettes²¹. It is noteworthy that in our study, the light cigarette smokers were higher consumers of water pipe and that was a significant difference versus the heavy cigarette smokers. That might suggest that they titrate their plasma level of nicotine from another source than the cigarettes as we alluded to in previous publications²⁶. But it can also indicate as it is noted in the literature that intermittent smoking is particularly associated with indulgent activities: relaxation, eating, and drinking alcohol⁶, and light smokers show no signs of tobacco withdrawal when abstinent¹⁹. They have a mixture of protective and risk factors during youth and later in life²⁰. Moreover, in addition to environmental factors, genetic factors could explain the smokers' profiles differences, in particular the issue of higher family smokers prevalence: indeed, genetic mutations on chromosome 15 induces some amino acid changes in the $\alpha 5$ nicotinic receptor protein seem to be involved, most likely biological variants altering the risk of smoking and of developing dependence^{27,28}. This remains to be established in other studies designed for this purpose.

This study has several limitations: being of a cross-sectional design, a selection bias is possible due to the nature of the cluster sample. A classification bias is also possible due to the reliance on individuals' answers to classify them into light smokers and heavy smokers; although carbon monoxide levels were measured to overcome this problem, there is probably an underreporting of smoking rate, which may pull the results towards the null. Moreover, although we carried out multivariate analysis to decrease confounding, residual confounding is still possible. Additional studies are necessary to take into account these limitations.

Conclusion

In Lebanon, males of the older generation seem to have higher cigarette smoking prevalence and rate, while females and younger people include higher prevalence of light cigarette smokers.

Conflict of interest statement

The authors have no conflict of interest to declare.

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