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Cigarette smoking, addiction, and quitting among pregnant women in Lebanon

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Summary
Aim: Prior studies of smoking among Lebanese pregnant women have not reported on measures of addiction and quitting plans. We aimed to assess measures of cigarette addiction, quitting plans, and behaviors prior to and during pregnancy, and their correlates among current pregnant women in Lebanon.
Design: Pregnant women presenting for prenatal services were interviewed about knowledge, attitudes and practices of cigarette smoking, degree of dependence, and quitting plans and actions.
Setting: A stratified sample of 23 primary care centers all over Lebanon.
Participants: A total of 864 women.
Measurements: Addiction scores, plans for quitting/stay quit, composite scores of knowledge of smoking harm and attitudes towards smoking control.
Findings: Of the 192 (22% of the total sample) women who smoked cigarettes prior to pregnancy, 41 (21%) quit due to pregnancy while 151 (79%) continued. Persistent smokers had higher addiction scores and higher self-rated smoking frequency than successful quitters. Although a third of persistent smokers tried to quit prior to pregnancy, only 21% were contemplating to quit now, without clear plans in the majority. Women's attitudes towards smoking control measures, and to a lesser extent knowledge of smoking harm, correlated with prior success, and current interest in quitting.
Conclusions: Cigarette smoking among Lebanese pregnant women remains alarmingly high. Few pregnant smokers plan to quit. There are important gaps in attitudes and knowledge towards smoking, which can be exploited to increase interest in quitting. That many women tried to quit previously, but failed, represents missed opportunities for prevention in this population.
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Introduction

Lebanon has the highest prevalence of women smokers (35%) in the Arab region [1]. Several recent studies have reported on the disconcerting phenomenon of continued smoking during pregnancy, estimated to represent 21% of all pregnant women in Lebanon [2—4]. Studies by Chaaya [3,4], and another study evaluating a broad sample of smoking mothers [5], have identified correlates of smoking during pregnancy. These include, as expected, educational level, pre-pregnancy smoking patterns and knowledge about effects of smoking on the baby. However, these studies did not assess or relate degree of addiction to plans for quitting and thus identify barriers and opportunities. Pregnancy is seen as a golden opportunity to intercept smoking at an important stage of a woman's life. Therefore, the present study was undertaken to assess addiction indicators, quitting, and plans for quitting in relation to smoking practices during pregnancy. The study also examined the relationship between quitting/planning and knowledge of smoking harm, and attitudes towards smoking control.

Methods

Design and sampling

The investigation was a cross-sectional study. The target population was pregnant women presenting for prenatal care at primary care centers (PCC) in all five Lebanese districts within the network of the Reproductive Health Program of the Ministry of Public Health (MOPH). Women attending PCC's are typically underserved and deserve increased attention from an equity perspective. The sampling frame was based on all 67 governmental and non-governmental PCC's in the network. A sample of 23 PCC's, stratified according to geographical area and expected number of pregnant women attending per month, was selected. From each of the five districts, PCC's receiving the highest volume of women (>50 women per month) were selected. In addition, up to five low-volume (<50 women per month) PCC's from each district were randomly selected to allow sampling of women with a potentially different profile than those attending high-volume PCC's.

Data collection and instruments

The investigators developed a questionnaire and submitted it for clearance in accordance with MOPH procedures. The MOPH suggested minor style and content revisions, which were incorporated. The instrument was pilot-tested on 30 women and further revised. PCC health workers underwent two-day training in interview techniques and administration of the final instrument. Pregnant women presenting to PCC's for prenatal care or other services were approached to participate and give consent. The 120-item instrument included questions on sociodemographic variables, smoking practices of both cigarettes and argileh (waterpipe or hubble-bubble), attitudes towards smoking control measures, knowledge about constituents of smoking and harmful effects. For cigarettes, indicators of addiction, quitting attempts, stages, and plans for quitting were solicited.

Measures

Addiction, measured using the Fagerstrom addiction measurement scale, was assessed for both successful quitters (measured prior to quitting among those who quit due to pregnancy) as well as for persistent smokers (those who continued to smoke during pregnancy). The Fagerstrom score was evaluated both as a discrete variable and as an ordinal variable. Categorization followed commonly used approaches: a Score of 0—3 points was considered to represent little or no addiction, 4—6 points moderate addiction, 7 and more points heavy addiction. A composite score was computed for knowledge questions (six questions with each correct answer receiving one point). A similar score was used for attitude questions (eight questions with each favorable attitude receiving one point).

Analyses

We compared characteristics, including addiction, knowledge and attitude indicators, of successful quitters vs. persistent smokers, and those planning to quit vs. those not planning to quit. We examined predictors of addiction, planning to quit as well as successful quitting. Chi-square or Fisher's exact tests were used for comparison of proportions. As most comparisons of proportions were done across several categories, e.g. three smoking status categories, reported *P* values represent *overall* test of significance. The *t*-test or rank—sum test was used for between-group comparison of continuous variables. Logistic regression was used to identify multivariate correlates of two binary dependent variables: successful quitting due to pregnancy and planning to quit/stay quit. Linear regression was used for identifying the multivariate correlates of the Fagerstrom score. Because of the relatively

small number of women with the adverse characteristic, i.e. outcome and to avoid the potential for statistical instability, variables were entered into multivariate models only if significant on univariate analysis ($P < 0.05$).

Results

Study sample and smoking practices

All (100% of 909) women who were approached for an interview consented to participate in the study. However, 5% did not complete the interview because they did not have enough time. Therefore, 864 women constituted the final study sample. Prior to pregnancy, 192 (22%) women smoked cigarettes with an average age of start of 18 years. Among these smokers, 41 (21%) quit due to pregnancy (successful quitters) while 151 (79%) continued to smoke during pregnancy (persistent smokers). In the latter group, only 10 women smoked both cigarettes and argileh. Because argileh smoking was both rare and occasional in nature, these women were analyzed with other cigarette smokers. Of persistent smokers, about half indicated smoking less than before pregnancy, 38.5% smoked the same, and 13% smoked more. Table 1 summarizes the sociodemographic characteristics of the study sample according to smoking status. There were no significant differences between successful quitters and persistent smokers. However, significant differences existed between persistent smokers and non-smokers on the one hand and between successful quitters and non-smokers on the other hand. Persistent smokers were significantly more likely than non-smokers to be older and less educated. Successful quitters were more likely than non-smokers to be older, to have higher income and to be multiparous.

Cigarette addiction

Table 2 summarizes the indicators of addiction according to smoking status during pregnancy. Compared with successful quitters, persistent smokers had higher mean Fagerstrom addiction scores, were three times more likely to be heavily addicted, and were almost twice as likely to self-rate smoking frequency as being moderate or high. The average number of cigarette packs smoked per week was 5.3 with more addicted women smoking more cigarettes.

Table 1 Distribution of the study sample across sociodemographic characteristics and smoking status ($N = 864$)

	Successful quitters ($N = 41$) Mean (SD)	Persistent smokers ($N = 151$) Mean (SD)	Non-smokers ($N = 672$) Mean (SD)	P
Age, years*	29 (5.46)	29.50 (6.15)	26.44 (6.01)	<0.01[a]
Age at marriage, years*	21 (3.53)	20.14 (5)	20.51 (4.26)	NS
Education, years*	9.90 (5.28)	9.18 (4.86)	10.82 (4.07)	<0.01[b]
	N (%)	N (%)	N (%)	
Women occupation**				
Ever worked	12 (29.3)	31(20.9)	138(21.3)	NS
Never worked	29 (70.7)	120 (79.1)	534 (78.5)	
Income/month				
No income or <USD330	13 (31.7)	72 (48.6)	286 (44.1)	0.04[c]
USD330-500	14 (34.1)	39 (26.4)	235 (36.1)	
>USD500	14 (34.1)	37 (25.0)	129 (19.8)	
Parity**				
Multiparous	32 (82.1)	113 (76.9)	422 (65.7)	<0.01[c]
Primiparous	9 (17.9)	38 (23.1)	250 (34.2)	
Family type**				
Nuclear	32 (84.2)	114 (81.4)	544 (86.6)	NS
Extended	9 (15.8)	37 (18.6)	128 (13.3)	

[a] Significant difference between persistent smokers and non-smokers and between successful quitters and non-smokers.
[b] Significant difference between persistent smokers and non-smokers.
[c] Significant difference between successful quitters and non-smokers.
* Means are compared for significance.
** Proportions are compared for significance.

Table 2 Indicators of cigarette addiction among successful quitters vs. persistent pregnant smokers

	Successful quitters (*N* = 41) Mean (SD)	Persistent smokers (*N* = 151) Mean (SD)	*P*
Fagerstrom scale	3.68 (2.33)	4.85 (2.46)	0.01[a]
	N (%)	*N* (%)	
Categorized Fagerstrom scale			
Little or no addiction	17 (48.6)	43 (30.5)	0.03[b]
Moderate addiction	14 (40)	53 (37.6)	
Heavy addiction	4 (11.4)	45 (31.9)	
Self-perception of smoking frequency			
Smoke a lot	4 (10.3)	30 (19.9)	0.03[b]
Smoke moderately	11 (28.2)	64 (42.4)	
Smoke a little	24 (61.5)	57 (37.7)	

[a] Based on independent sample *t*-test.
[b] Based on χ^2-test.

Quitting attempts, plans, and success

Of 192 women smokers in this sample, 92 (48%) tried to quit smoking prior to or due to pregnancy; almost half of these succeeded (41 women — successful quitters) and the rest failed (51 women — persistent smokers). The 41 successful quitters managed to quit after an average of 2.5 attempts and identified the main reasons for quitting: husband's request (23.5%), health problems in a previous pregnancy (18%), and bad health effects (15%). As indicated above, 51 of the 151 persistent smokers had tried to quit before but failed. Persistent smokers identified craving (28.5%), habit (22.5%), and smoking during morning social visits, a common tradition among women in Lebanon, (15%) as the main reasons for failing to quit. Interestingly, both successful quitters and persistent smokers identified the same approaches as being most helpful (quitters) or potentially most helpful (smokers) for quitting: work distraction (20% vs. 39%), eating candy and sweets (26% vs. 10%), and support of friends and family (11.5% vs. 10%).

Among the 151 persistent smokers, 21% were planning to quit. Of these three quarters did not know when they would quit and did not have a clear plan. The case is similar for successful quitters whereby only 23% were planning to stay quit. Those planning to quit/stay quit were more likely to be working women (38.5% vs. 19.3%, *P* 0.018) and to have lower Fagerstrom scores, although differences in scores did not reach significance (data not shown).

Tables 3 and 4 show knowledge of smoking harm and attitudes towards smoking control. Successful quitters and those planning to quit/stay quit

Table 3 Knowledge about smoking harm among study women[a]

	According to quit status		*P* value	According to plan to quit/stay quit		*P* value
	Successful quitters (%)	Persistent smokers (%)		Planning (%)	Not planning (%)	
Cigarettes contain addictive substances[a]	64.0	69.4	NS	63.4	66.0	NS
Cigarettes produce harmful gasses[a]	46.3	35.8	NS	48.8	35.8	NS
Cigarettes contain carcinogens[a]	52.5	56.3	NS	65.9	52.7	NS
Cigarettes affect the fetus[a]	71.1	61.9	NS	80.5	60.0	<0.05
Cigarettes affect the newborn[a]	64.1	59.7	NS	78.0	56.6	<0.05
Smoking in lesser quantities does NOT lead to decreased harmful effect on the fetus[a]	64.0	69.4	NS	14.7	18.8	NS
Knowledge score (of possible 6)	3.96	3.99	NS	3.97	3.97	NS

NS = non-significant *P* values.
[a] Numbers are % of women in the category group which exhibited correct knowledge about harm from smoke.

Table 4 Attitudes towards smoking control among study women

	According to quit status		*P* value	According to plan to quit/stay quit		*P* value
	Successful quitters (%)	Persistent smokers (%)		Planning (%)	Not planning (%)	
Support smoking ban for <18 years of age[a]	87.2	79.6	NS	87.2	81.0	NS
Support banning tobacco advertisements on TV and radio[a]	82.1	56.7	<0.05	79.5	57.3	<0.05
Support the warning message on cigarettes packs[a]	71.8	68.2	NS	71.1	68.5	NS
Support smoking ban in hospitals and health institutions[a]	100.0	96.6	NS	97.4	97.3	NS
Support smoking ban inside restaurants[a]	50.0	36.2	NS	59.5	34.0	<0.05
Support smoking ban at work[a]	64.1	55.7	NS	61.5	55.7	NS
Support smoking ban in public transportation[a]	86.8	75.3	NS	81.6	76.7	NS
Support smoking bans in public gardens[a]	17.9	10.7	NS	17.9	10.7	NS
Attitude score (of possible 8)	6.37	5.66	0.05	6.48	5.63	0.03

NS = non-significant *P* values.
[a] Numbers represent % of women in the category group who exhibited agreeable attitudes towards tobacco control.

tended to have improved knowledge and be more supportive of tobacco control. However, many of the differences did not reach statistical significance probably because of the sample size.

Table 5 presents the results of multiple regression analysis to identify predictors of successful quitting and planning to quit/stay quit. A heavy addiction Fagerstrom score was the only significant predictor regarding successful quitting. Heavily addicted women were 86% less likely to quit compared to those with no or little addiction (OR 0.14, 95 CI 0.03—0.72). As for planning to quit/stay quit, women who favored smoking control measures were significantly more likely to do so (OR 1.23, 95% CI 1.23—1.64). Women who ever-worked also appeared more likely to quit/plan quitting but

Table 5 Multivariate predictors of quitting and of planning to quit/stay quit among study women

	Adjusted OR (95% CI)	
	Successful quitting (*N* = 41 quit vs. *N* = 151 did not quit)	Planning to quit/stay quit (*N* = 40 planning vs. *N* = 149 not planning)
Sociodemographics		
Age	1.00 (0.92—1.10)	
Years of education	1.00 (0.90—1.11)	
Ever working		2.08 (0.86—5.02)
Never working		1.00
Low income	0.50 (0.15—1.65)	
High income	1.00	
Woman has children	0.95 (0.30—3.03)	
Woman has no children	1.00	
Fagerstrom score		
Little or no addiction	1.00	
Moderate addiction	0.57 (0.21—1.54)	
Heavy addiction	0.14 (0.03—0.72)	
Composite scores		
Attitudes towards smoking control[a]	1.23 (0.94—1.61)	1.30 (1.02—1.64)

Note: Variables entered into multivariate logistic model if significant on univariate analysis.
[a] Higher score means women favoring smoking control.

this did not reach statistical significance (OR 2.08, 95% CI 0.86—5.02).

As for the predictors of addiction, multiple linear regression analysis of the Fagerstorom scores showed that older age was significantly associated with higher scores (*B* coefficient 0.19, 95% CI 0.018—0.14) while more years of education (*B* coefficient −0.15, 95% CI −0.16—0.002) and improved knowledge of smoking harm (*B* coefficient −0.17, 95% CI −0.16—0.08) were associated with lower scores (data not shown in tables).

Discussion

Smoking patterns

The findings of smoking practices during pregnancy in this study are consistent with prior studies in Lebanon. The stagnant prevalence rates indicate that little progress has been achieved in the past few years towards controlling smoking in this population. Although argileh (waterpipe or hubble-bubble) smoking is increasing in the Arab region [6], it was rather rare among smokers in this study. This indicates that mixed forms of tobacco addiction are rare and cigarettes predominate among pregnant Lebanese women.

Addiction and quitting

Fagerstrom scores were overall low in this population. However, they were comparable to those reported among pregnant women in other populations [7]. Expectedly, persistent smokers had higher scores and self-rated their amount of smoking higher. This is consistent with research findings of higher addiction scores among persistent pregnant smokers in France [8]. It is interesting to speculate about why many women continued to smoke despite absence of high levels of addiction (68% had low or moderate addiction scores). Women may have changed their smoking behaviors after occurrence of pregnancy thereby contributing to lower addiction scores as scoring relies on reported behaviors. This is corroborated by the fact that half of the persistent smokers reported smoking less during pregnancy. The low—moderate level of addiction may be adequate for maintaining the habit. Addiction scores may have been under-estimated due to the phenomenon of social desirability in which women report less smoking/addiction to please the interviewers. It is also possible that women were not willing, rather than unable, to quit for other reasons, e.g. related to knowledge or attitudes.

That so many study women (almost half) tried, at some point or another, to quit but failed indicates the need to provide more support for smoking cessation for women of child-bearing age. On the other hand, planning to stay quit was low among successful quitters (21%, which is similar to the percentage of persistent smokers planning to quit, 23%). This indicates the need to target interventions not only at current pregnant smokers but also at all pregnant women with a history of smoking to prevent relapse, especially post-partum.

It is interesting that both successful quitters and persistent smokers identified the same approaches as being most helpful (or potentially so for the smokers) for quitting. This likely reflects common community views, at least among women, on quitting methods. That eating sweets and candy is considered as one of the top three approaches indicates the need to upgrade knowledge about the harm—benefit profile of different approaches.

Knowledge and attitudes towards smoking

Overall, study women were only partially knowledgeable about smoking harm. For example, 75% of all women were under the misconception that decreasing smoking during pregnancy reduces harm. This may explain why half of persistent smokers reduced their smoking during pregnancy. It is interesting to speculate whether higher levels of knowledge would have led more women to quit smoking. There was little variation in composite scores of knowledge of smoking harm among study women according to quit status or plan to quit/stay quit status. Interventions aimed solely or mostly at upgrading knowledge about smoking harm may not therefore have the desired impact.

On the other hand, there was variation in composite scores of attitudes with successful quitters and those planning to quit/stay quit being more in support of tobacco control measures. Indeed, in logistic modeling, attitude score was the single predictor of both actual quitting as well as planning to quit. This is consistent with the finding that attitudes are among the most important predictors of smoking status during pregnancy in Lebanese women [4,5]. Attitudes are complex phenomena that involve social as well as individual attributes and thus are more difficult to change but are likely to be more important targets for interventions [9].

Study strengths and weaknesses

The study has several strengths. All Lebanese districts are represented. The partnership with the

MOPH presents a useful model for academic-public health collaboration on research which is much needed in Lebanon and similar countries. Use of interviewers from within the primary care centers is innovative as it draws on existing resources and improves capacity for participation in research in these centers.

The study has several limitations. The large number of interviewers might have led to variations in the quality of data collection in the different centers. However, this is unlikely as all interviewers underwent the same training and our quality control checks of adherence to questionnaire administration procedures and completeness and quality of collected data did not indicate any substantial differences. Although the study included a relatively large number of pregnant women, the number of smokers was not large and the number of smokers who quit (or planning to quit) was small. Therefore, the predictive power of multivariate analyses was limited as only a small number of explanatory covariates could be included in order to prevent instability of the statistical models.

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