

Evaluation and Challenges of a Smoking Cessation Program in the Eastern Mediterranean Region: A Mixed-Method Approach

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Abstract

Introduction: Given the lack of studies on tobacco cessation interventions in the Eastern Mediterranean region, this paper presents findings from a smoking cessation program (SCP) in a tertiary referral center. The aim is to evaluate the predictors, facilitators, and barriers associated with successful smoking cessation from both participant and provider perspectives. **Materials and Methods:** A mixed-method approach was used. Part 1 was a retrospective cross-sectional quantitative study with a telephone-based survey conducted on a sample of 47 patients enrolled in the SCP between March 2014 and August 2017. Part 2 was a qualitative study comprising a focus group discussion among five practitioners from the SCP. **Results:** Only 37% reported being adherent to the prescribed treatment and 74.5% reported receiving behavioral counseling. In the multivariate logistic regression analysis, adhering to pharmacotherapy increased the odds of being a quitter at 1 and 6 months after quit date (QD), whereas completing behavioral counseling increased the odds of being a quitter at 1, 6, and 12 months after QD. Point prevalence abstinence at 1 month and prolonged abstinence at 6 and 12 months after QD were 42.2%, 32.6%, and 24.4%, respectively. The overall relapse rate reached 62.5%. Facilitators and barriers fell under three subthemes: (1) participant factors; (2) provider factors; and (3) system factors. The most common barriers for non-compliance to the program were stress factors, nicotine addiction, accessibility and availability of pharmacotherapy, cost of the program and medications, and time restrictions. **Conclusion:** Adherence to pharmacotherapy and receiving behavioral counseling increase the odds of smoking abstinence maintenance. Success or failed cessation is influenced by several underlying factors operating on multiple levels and understanding them might help improve tobacco cessation interventions.

Keywords: Cessation program, qualitative, quantitative, smoking, tobacco

INTRODUCTION

Tobacco use has been responsible for avoidable early death and disability all over the world due to the adverse health effects it causes including malignancy, cardiovascular, and respiratory diseases.^[1] The smoking prevalence in low- and middle-income countries is estimated to reach over 40%, and exceeding 30% in Lebanon, ranking first for tobacco consumption compared with other countries of the Eastern Mediterranean region (EMR).^[2]

Most smokers are familiar with the health consequences of tobacco consumption and many desires to quit, but quitting without assistance has shown to be difficult due to nicotine's addictive nature.^[3] Yet, tobacco cessation interventions including pharmacotherapies such as nicotine replacement therapy (NRT), bupropion and

varenicline, and behavioral support (as simple as a brief advice from healthcare practitioners) have been proven to increase the odds of smoking cessation.^[4] In developed countries, tobacco cessation programs have been proven to be cost-effective in promoting abstinence among smokers leading to less tobacco-related diseases and

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lower mortality.^[5] Meanwhile, there exists a challenge to implement efficient tobacco control policies and treatment programs in the EMR countries in which availability and affordability of cessation services and pharmacotherapy were revealed to be lacking or insufficient.^[6] The perceived costs of providing a sustained tobacco dependence treatment support and the lack of clear evidence about its cost-effectiveness remain a main challenge toward implementing smoking cessation interventions in this region.^[7]

This research evaluates the outcomes of a smoking cessation program (SCP) at a tertiary referral center. Part 1 used a quantitative telephone-based survey that addressed smokers who were enrolled in the SCP to analyze success and relapse rates (RRs), as well as predictors of sustained abstinence. Part 2 used a qualitative method to explore the factors believed by the providers to influence smoking cessation outcomes.

MATERIALS AND METHODS

Study design

A mixed-method approach with a parallel design was used. Quotations were displayed to supplement the qualitative analysis, and triangulation of the results from the perspectives of both the participants and practitioners was done. The GRAMMS guidelines were followed in reporting. Ethical approval was acquired from the Institutional Review Board at the American University of Beirut. Prior to enrollment in the study, verbal and written informed consents were obtained by both participants and care providers in the SCP.

Part 1

Design

This is a retrospective cross-sectional quantitative study with a telephone-based survey.

Setting and participants

The study population included patients who were enrolled in an outpatient SCP at the American University of Beirut Medical Center (AUBMC) in Beirut, Lebanon. The program was staffed with two smoking cessation physicians, two specialized nurses, and one administrator. At the first visit, participants were introduced to the program and underwent a full assessment during which medical history, physical assessment, pulmonary function test, and carbon monoxide (CO) level were assessed. Nurses also completed a behavioral assessment form (BAF) which records patients' tobacco use, smoking habits, and nicotine dependence. This was followed by a visit to the physician to receive the appropriate treatment plan based on international practice guidelines. The patient sets a quit date (QD) with the help of the physician in

addition to a medication prescription that can include NRT, bupropion, varenicline, or combination therapy.

The remaining follow-up sessions were either in-person or telephone-based and took place on a weekly basis until 2 months have passed. In parallel with the weekly visits, two follow-up visits with the physician are arranged (at 1 month and 2 months post-QD). Data gathered from the baseline and subsequent visits are all recorded in the electronic medical records of the patients.

In total, 72 smokers enrolled in the SCP between March 2014 and August 2017. We successfully contacted 52 participants. Of these, 47 agreed to participate in the study. The other 20 participants had incorrect phone numbers, unable to be reached, or deceased.

Procedure

The program's administrator extracted a list of enrolled participants between March 2014 and August 2017. Then, the nurses administered a telephone-based survey after verbal consent was obtained. The survey took approximately 10 min to complete; it consisted of sections on general demographics, enrollment in the SCP, intervention methods including pharmacotherapy and behavioral counseling sessions, and participants' satisfaction with the program. Also, participants' electronic medical records were reviewed for additional information retrieved from the BAF.

Measures

Baseline sociodemographic and smoking characteristics including baseline carbon monoxide level, Fagerström nicotine dependence test (FTND), and motivation to quit were obtained from participants' initial BAF documented in their electronic medical records. Treatment characteristics such as prescribed pharmacotherapy and adherence and completion of behavioral counseling sessions were acquired from the telephone survey. Recall bias was minimized by verifying the gathered data with the information recorded in participants' medical records.

Quit rates were evaluated by measuring the point prevalence abstinence (PPA) rate at 1 month post-QD, prolonged abstinence (PA) rate at 6 and 12 months post-QD, and RR. A self-reported quit outcome of each participant was used. PPA and PP were calculated by dividing the number of non-smokers at each designated period by the total number of participants in the program.^[8] RR was defined as smoking five or more cigarettes per month after a quit attempt and measured by dividing the number of participants who relapsed after a successful quit attempt by the total number of quitters.^[9]

Data analysis

Data analysis was performed on Statistical Package for the Social Sciences (SPSS), version 23. Categorical data were shown as frequencies and percentages, whereas continuous

data were presented as means and standard deviation (SD). Association between baseline and treatment characteristics with quit outcome at 1, 6, and 12 months after QD was evaluated using the chi-square test, simple logistic regression (unadjusted OR), and multivariate logistic regression (adjusted OR). Variables with *P*-value less than 0.2 were exported to the multivariable logistic regression model. A *P*-value less than 0.05 was considered statistically significant.

Part 2

Design

This includes a focus group discussion (FGD) among the five SCP practitioners.

Participants

Six practitioners were invited by a publicly available email to participate in the study along with a written consent form. Five out of six providers (including two tobacco-treatment physicians, two specialized nurses, and one administrator) agreed to participate in the FGD.

The FGD

The FGD was 1-h long and conducted by a researcher specialized in qualitative interviewing who used a prepared set of questions covering topics relating to smoking cessation services and interventions as well as enablers and barriers related to success or failure of cessation among smokers. The discussion was audio-recorded and transcribed by one interviewer and reviewed by another to eliminate errors. Passages were coded and then compared to be grouped into categories which were then sorted into themes and subthemes.

RESULTS

Quantitative analysis

Baseline sociodemographic and smoking characteristics

Forty-seven patients were included in the final analysis giving a response rate of 90%. Baseline sociodemographic and smoking characteristics of the respondents are presented in Table 1. The mean participant's age was 47.5 years (± 14.8), and more than half were males (57.4%). Nearly two-thirds of the participants started smoking at teenage years (63%). The majority had previous quit attempts (84%) and reported that their main motives to quit were health related. The average reported subjective motivation to quit among respondents was 7.6 (± 1.94) out of 10. As for the prescribed pharmacotherapy, the most common treatments were combination therapy (44%) or NRT alone (35%).

Treatment characteristics

Of the total respondents, 91% reported trying smoking cessation pharmacotherapy, but only 37% reported being adherent to the prescribed treatment as shown in Table 2. Most of the patients (74.5%) received

Table 1: Baseline sociodemographic and smoking characteristics of SCP participants (*n* = 47)

Characteristic	N (%)
Gender	
Male	27 (57.4)
Female	20 (42.6)
Age, years (mean $\pm$ SD)	47.5 $\pm$ 14.8
Age at smoking initiation	
Adolescence (<19)	26 (63.4)
Adulthood (≥ 19)	15 (36.6)
Initial daily cigarette consumption	
11–20	12 (28.6)
21–30	18 (42.9)
31 or more	12 (28.6)
Previous quit attempts	
No	7 (16.3)
Yes	36 (83.7)
Initial FTND score	
< 7	19 (46.3)
≥ 7	22 (53.7)
TTFC	
Less than or equal to 30 min	36 (85.7)
More than 30 min	6 (14.3)
Baseline CO level (mean $\pm$ SD)	20.5 $\pm$ 13.3
Motivation to quit (mean $\pm$ SD)	7.7 $\pm$ 1.9
Motives to quit	
Health-related	38 (100)
Personal and/or socio-economic	16 (42.1)
Initial pharmacotherapy	
None	4 (8.9)
Combination	20 (44.4)
NRT	16 (35.6)
Bupropion or varenicline	5 (11.1)

FTND = Fagerström nicotine dependence test; TTFC, time to first cigarette; CO, carbon monoxide. Motivation to quit: scores range from 0 to 10 reported subjectively, with larger values indicating a higher motivation level. NRT = nicotine replacement therapy

Note: Numbers do not add up to total sample size indicating missing data values

behavioral counseling but only 26% completed at least four sessions.

For baseline characteristics, no significant associations were found between the variables and outcomes at each period except for the FTND score and motivation to quit [Table 3]. The odds of being a quitter at 12 months after QD for patients who have FTND score above 7 are 8.88 times that of patients with FTND score below 7. Meanwhile, no significance was found when adjusting for other variables. In addition, for one-unit increase in the motivation to quit, the odds of being a quitter increased by a factor of 1.55 and 0.64 when accounting for age at smoking initiation at 1 month after QD.

As for treatment characteristics, the odds of being a quitter at 1 and 6 months after QD for participants who adhered

Table 2: Treatment characteristics of SCP participants (n = 47)

Characteristic	N (%)
Adherence to pharmacotherapy	
No	27 (62.8)
Yes	16 (37.2)
Completion of counseling sessions	
No	12 (25.5)
Yes	35 (74.5)
Number of counseling sessions received	
< 4 session	23 (48.9)
≥ 4 sessions	24 (51.1)

Notes: Numbers do not add up to total sample size indicating missing data values

to the prescribed pharmacotherapy are 12.1 and 11.5 times than that of patients who were non-adherent, respectively [Table 4]. When adjusting for completion of behavioral counseling sessions, the odds of being a quitter at 1 and 6 months after QD for participants who adhered to the pharmacotherapy are 8.26 and 7.85 times than those who were non-adherent. The most common self-reported reasons for non-adherence were unavailability of medications and lack of perceived benefit of the medications. Moreover, completing behavioral counseling sessions increased the odds of being a quitter at 1, 6, and 12 months after QD by a factor of 6.90, 7.71, and 5.60, respectively, compared with those who did not complete behavioral counseling. However, after accounting for adherence to pharmacotherapy, the odds of being a quitter at 1 and 6 months after QD for those who completed behavioral counseling sessions were 6.00 and 4.61 times than those who did not complete the sessions with no significant association at 12 months.

PPA, PA, and RR

The PPA at 1 month and PA at 6 and 12 months after QD were 42.2%, 32.6%, and 24.4%, respectively. Overall RR of quitters reached 62.5%. More than half (58%) of the reported reasons for relapse were stress factors.

Qualitative analysis

A central theme that emerged from the FGD was facilitators and barriers contributing to successful smoking abstinence among smokers enrolled in the program and branching into three subthemes: participant, provider, and system-based factors [Table 5].

Participant factors

The program's providers believed that motivation is a significant enabler for successful smoking cessation and its lack eases failure. Also, the main intrinsic factor that encouraged young smokers to think about stopping smoking is the prospect of living a healthy lifestyle. Meanwhile, the key driver that urged adult smokers to quit was the impact of smoking on their physical health

and fear of developing smoking-related health problems. Interestingly, providers suppose that smokers with worse health status have better chances to succeed in quitting. Other major extrinsic facilitators pertinent to smokers attempting to quit were the presence of social support and fear of tarnishing their social image.

When discussing barriers to cessation, providers believed that those less likely to succeed or comply with the program tend to be younger, less committed, have high baseline level of anxiety or depression, and pressured by parents or relatives to quit smoking. They also stated that patients report concerns of peer rejection, losing pleasure of smoking, coping with withdrawal symptoms, and changing their lifestyle habits. Meanwhile, reported time constraint, traffic, and travel distance operated as logistical barriers contributing to poor compliance.

Provider factors

Providers' perceived facilitators were reduced physician consultation fees, nurses' behavioral support, technology use, implementation of awareness campaigns, and encouragement of referral among other physicians.

The program's practitioners viewed themselves as being supportive and participant-centered which promotes participants' compliance. The SCP's nurses increased their availability to patients by choosing to communicate through texting via mobile applications such as WhatsApp and/or e-mailing.

The main barriers were physicians' time constraints, especially since smokers require more clinic time compared with regular patients. The nurses reported a similar challenge as they believe that the patients' visit must be long enough to allow them to discuss psychosocial aspects other than coping with physical symptoms. Finally, while nurses' international training was very helpful for delivering behavioral support, they thought it was not fully adapted to the Lebanese mentality and culture. They also believe that behavioral support remains challenging as it is psychological, and more training and experience are needed to improve it.

System factors

Unlike today's implemented efforts to make the campus smoking-free, no well-organized directives were set at the launch of the program to fight for smoking cessation or control.

Practitioners believed that the referral of hospitalized smokers to smoking cessation services remains suboptimal by both the physicians and nurses in charge. The nursing staff are not sufficiently trained on delivering smoking cessation interventions. They tend to document patients' smoking history without implementing the 5 As (Ask, Advice, Assess, Assist, and Arrange). In addition, the availability and cost of smoking cessation medications

Table 3: Baseline characteristics associated with quit outcome at 1, 6, and 12 months after QD using simple logistic regression (unadjusted OR) and multivariate logistic regression (adjusted OR)

	1 month after QD				6 months after QD				12 months after QD			
	Unadjusted		Adjusted		Unadjusted		Adjusted		Unadjusted		Adjusted	
	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Gender												
Female (ref.)												
Male	1.47 (0.44–4.92)	0.533	1.24 (0.35–4.32)	0.740			1.38 (0.34–5.62)	0.652				
Age, years (mean ±SD)	0.97 (0.93–1.01)	0.201	0.97 (0.93–1.01)	0.251			1.013 (0.96–1.06)	0.590				
Age at smoking initiation												
Adolescence (<19) (ref.)												
Adulthood (≥19)	2.43 (0.65–9.07)	0.187	2.55 (0.58–11.19)	0.216	1.42 (0.37–5.36)	0.608		2.53 (0.60–10.56)	0.202			
Initial daily cigarette consumption												
11–20	2.50 (0.42–14.60)	0.309	4.16 (0.61–28.62)	0.147	4.34 (0.29–62.80)	0.282	6.28 (0.57–68.42)	0.131	1.28 (0.17–9.31)	0.80		
21–30	3.00 (0.60–14.86)	0.178	3.18 (0.53–19.05)	0.205	3.48 (0.28–42.33)	0.327	6.00 (0.61–58.42)	0.123	—	—	—	—
31 or more (ref.)												
Previous quit attempts												
No (ref.)												
Yes	1.87 (0.32–11.01)	0.487	1.30 (0.21–7.75)	0.770			2.50 (0.26–23.52)	0.423				
Initial FTND score												
< 7 (ref.)												
≥ 7	1.71 (0.47–6.24)	0.414	0.36 (0.09–1.44)	0.150	0.62 (0.13–3.07)	0.56	8.88 (1.56–50.53)	0.014	3.81 (0.42–34.30)	0.233		
TTFC												
Less than or equal to 30 min	1.07 (0.16–7.22)	0.943	0.29 (0.04–2.01)	0.212					5.06 (0.72–35.77)	0.104	8.50 (0.48–148.60)	0.142
More than 30 min (ref.)												
Baseline CO level (mean ±SD)	1.03 (0.97–1.09)	0.350			0.98 (0.93–1.04)	0.582					1.00 (0.95–1.06)	1.00
Motivation to quit (mean ±SD)	1.55 (1.02–2.34)	0.039	0.64 (0.41–0.99)	0.047	0.72 (0.49–1.05)	0.083	0.81 (0.55–1.23)	0.330	0.69 (0.46–1.02)	0.068	0.69 (0.42–1.15)	0.159
Motives to quit												
Personal and/or socio-economic (ref.=no)	1.16 (0.30–4.49)	0.823			0.78 (0.18–3.34)	0.730					2.25 (0.38–13.17)	0.368

Table 3: Continued

	1 month after QD				6 months after QD				12 months after QD			
	Unadjusted		Adjusted		Unadjusted		Adjusted		Unadjusted		Adjusted	
	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Prescribed pharmacotherapy												
None (ref.)												
Combination	0.56 (0.04–7.21)	0.653			2.70 (0.23–30.85)	0.424			1.071 (0.08–12.83)	0.957		
NRT	0.16 (0.01–2.36)	0.186			0.69 (0.05–9.21)	0.781			0.750 (0.05–10.02)	0.828		
Bupropion or varenicline	0.33 (0.02–6.65)	0.472			0.75 (0.03–17.51)	0.858			0.750 (0.32–17.50)	0.858		

FTND = Fagerström nicotine dependence test; TTFC = time to first cigarette; CO = carbon monoxide; motivation to quit: scores range from 0 to 10 reported subjectively, with larger values indicating a higher motivation level; NRT = nicotine replacement therapy

small number of pharmacies provided this type of pharmacotherapy and the hospital pharmacy did not have any available stocks.

Moreover, funds to provide a quitline to the program are insufficient, and insurance coverage of smoking cessation services for both outpatients and inpatients was widely lacking. The government also plays a crucial role in reducing smoking. However, Lebanon's tobacco control legislations and preventive measures are weakly enforced, despite the presence of a law for banning smoking in public places. Finally, policies related to cost and accessibility of tobacco products are absent along with the lack of financial support and incentives for smoking cessation and health education campaigns.

DISCUSSION

Principal findings

The aim of this paper is to evaluate factors influencing abstinence among smokers enrolled in a tobacco-treatment program by comparing quitters with non-quitters. Using an FGD, we sought providers' perspective to better understand facilitators and barriers affecting smokers attempting to quit. Quantitative analyses showed that patients' compliance and adherence to cessation interventions were associated with PA.

The main differences that we found between smokers who quit successfully and those who relapsed were related to treatment characteristics. Our results revealed that the odds of being a quitter among those who adhered to pharmacotherapy were higher than non-adherent patients at 1 and 6 months after QD. This is in line with strong evidence correlating treatment adherence with tobacco abstinence.^[10–12] It is also comparable to another local

with the offered treatment increased the odds of success. Among those who did not adhere to the medications, individual reasons were reported to be medication side effects, fear to use treatment, and patients' perception that the medication had not helped with cessation. Similar patterns were found in several studies in which side effects and beliefs that smoking cessation aids do not help with quitting were common reasons for discontinuing cessation pharmacotherapy.^[14–16] It is not clear whether users anticipated the side effects after being counseled to expect them by the providers or whether they did not receive the adequate education. It is also plausible that participants may have not tolerated mild side effects or confused withdrawal symptoms with them leading to abrupt discontinuation. Therefore, increasing patient adherence by encouraging smokers to return for follow-up visits and provide proper education on the safe usage and effectiveness of cessation medications is an important task for clinicians to adopt.^[17] Similarly, the odds of being a quitter at 1, 6, and 12 months increased among those who completed behavioral sessions. This is consistent with previous findings that showed increasing amount of behavioral support raises the likelihood of success, and another meta-analysis that showed increasing number and duration of counseling session were related to successful smoking cessation 12 months after intervention initiation.^[11,18–20] However, many patients might find engaging in counseling sessions a challenge due to time constraints as narrated in the qualitative part. This might urge the need for providers to tailor cessation services to offer smokers convenient yet effective options for behavioral support. Our findings are in agreement with results of earlier research studies that revealed interventions such as behavioral support and pharmacotherapy are both effective compared with minimal cessation intervention,

Table 4: Treatment characteristics associated with quit outcome at 1, 6, and 12 months after QD using simple logistic regression (unadjusted OR) and multivariate logistic regression (adjusted OR)

	1 month after QD			6 months after QD			12 months after QD		
	Unadjusted		Adjusted	Unadjusted		Adjusted	Unadjusted		Adjusted
	OR (95% CI)	P-value		OR (95% CI)	P-value		OR (95% CI)	P-value	
Adherence to pharmacotherapy	12.10 (2.69–54.27)	0.001	8.26 (1.66–41.02)	11.50 (2.54–52.05)	0.002	7.85 (1.59–38.71)	3.67 (0.83–16.17)	0.086	2.13 (0.41–11.15)
Completion of counseling sessions	6.90 (1.53–31.01)	0.012	6.00 (1.06–33.92)	7.71 (1.79–33.27)	0.006	4.61 (0.86–24.64)	5.60 (1.27–24.56)	0.022	4.69 (0.89–24.67)

Table 5: Themes, subthemes, and specific exemplary quotes from the FGD

Theme	Subtheme	Exemplary quote	
		Facilitators	Barriers
Facilitators and barriers	Participant factors	“Parents don’t want to harm their kids, especially because the educated ones know the harmful effects of smoking on their kids, so they do it to prevent diseases and protect their children” (T.2) “Those who succeed are usually the sick patients, [...] they feel that if they don’t quit, they are going to die” (N.2)	“[...] statistics are showing that stress level in Lebanon is really very high, and we’re diagnosing more often depression and anxiety [...] so this will add to the problem as well. Because they see it as a stress reliever” (M.3) “They have to pass through the withdrawal symptoms. Some people can’t tolerate being anxious [and have] GI disturbances after stopping” (R.3) “Certain age, especially teenagers, consider that if you don’t smoke then you don’t belong to the group” (R.2) “Whenever they are not motivated and coming only for their mom, they don’t quit, and they relapse easily” (M.2) “They are very psychologically oriented and affected by how people treat them and the service that they get” (S.2) “Some participants don’t have time to come on weekly basis to spend an hour, maybe the traffic in our location is a hinder also” (R.2)
	Provider factors	“We only charge the patients for the first visit and then the second or third follow up visits are free of charge” (M.2) “We are very supportive and welcoming” (S.2) “When I started using WhatsApp, I was more available to my patients, and that helped a lot” (R.2)	“When I merge the smoking cessation appointments with regular patients, it becomes a hassle for me to deliver appropriately” (M.3) “Smoking is addiction, and the nature of the disease by itself is a major barrier because you’re talking about physical, behavioral, social and mental addiction... you have to tackle all these addictions, whereas with regular patients [...] you only have to tackle one target during the encounter” (M.3) “The training we are having is different than the culture we are dealing with, that’s why sometimes we make this personal modification in the way we talk, the way we handle things” (T.3) “Having the knowledge is really important but practice is more important” (T.4) “One should be willing to read more to do the behavioral therapy. It is a major by itself and not all nurses can do it” (R.4)
	System factors	“In 2016, after our campus became tobacco free, the president supported an initiative, and we were [provided] with 2 new staff in the program and with medications for the [participants with Health Insurance Plan (HIP) reimbursed by the HIP insurance company based at AUB]” (M.3)	“[...] we have lack of referrals even from oncologists or cardiologists, probably they are counseling their patients, but they don’t refer them” (M.3) “The nurses are not counseling the patients, whenever the patient tells them that I am a smoker, it’s as if they are asking them about the age, gender, and exercise... They notify the doctor only” (M.3) “At one time we had a big issue for maybe 2 years. It was a main barrier, the medication availability” (M.3) “It would help more if the insurance companies cover the smoking cessation or encourage to participate” (R.3)

and combining them together is more effective than using each intervention alone.^[4,18,21]

Cost and unavailability of medications were also contributing factors for patients to stop treatment. During the FGD, providers viewed the unavailability of pharmacotherapy and the cost of cessation services as significant barriers to successful quitting, attributing these obstacles to the absence of governmental role in implementing tobacco control policies. This is clearly explained by the lack of access and financial coverage of cessation treatments in the EMR region, which urgently demands implementing national plans to better adopt tobacco control policies.^[22] By providing greater access to cessation services along with subsidized or financially covered treatments through governmental bodies or insurance companies, we aim to encourage treatment use and increase quit attempts among smokers leading to decreased smoking rates in our community.^[23-25] Not to mention the importance of establishing office and hospital-based cessation interventions needed to address provider and system-level barriers such as deficiencies in the healthcare system toward tobacco control. Implementing system-wide smoking status documentation of patients and referral programs, as well as providing counseling training opportunities for clinicians, should be a priority in promoting physician involvement in cessation efforts and enhancing smokers' engagement in tobacco treatment programs.^[23-25]

Our data found no significant associations between baseline characteristics of the participants and their quit outcome, except for patients' FTND score and motivation to quit. With the increase in the motivation to quit, the odds of being a quitter increased at 1 month after QD but not at 6 and 12 months. Although there is strong evidence that initial level of motivation to quit is predictive of successful smoking cessation, several studies found that it is not necessarily related to maintaining abstinence.^[26,27] Factors that motivate smokers to initiate a quit attempt are reported to be different from those contributing to tobacco cessation maintenance which explains our finding to be significant only at 1 month after QD.^[26] This calls us to consider assessing motivation using different approaches and time periods during the smoking cessation process in order to provide more tailored and effective counseling strategies. Meanwhile, we have found that high dependence (high FTND score) increased the odds of being a quitter at 12 months than low dependence (low FTND score) which is in contrast to earlier literature where smokers with high dependence are reported to experience intense withdrawal symptoms leading to early relapse.^[27] A possible explanation is that the process of quitting smoking is influenced by many interrelated predictors interacting with nicotine dependence, some that we might have missed to measure such as self-efficacy or desire to quit which are robust predictors of successful cessation.

Quit rates at 6 and 12 months were 32.6% and 24.4%, respectively, which are comparable with 1-year quit rates achieved by cessation programs worldwide ranging between 20% and 43%.^[28-31] However, RR was found to be 62.5% with no significant predictors among relapsers, which contrasts with the literature.^[32] Although successful PA can be reflected by the effectiveness of combining cessation interventions and patients' compliance, the high RR can be explained by psychological distress that impacts the Lebanese society making individuals seek smoking for stress relief as we learned from one of the providers in the FGD and patients' reported reasons for relapse.^[32,33]

Strengths and limitations

This is the first study to use a mixed-methods approach to evaluate a smoking cessation program in the EMR, but it comes with limitations. The sample size of patients enrolled in the program between the selected dates is small, affecting the statistical power of our results which may have failed to reveal meaningful predictors and is not representative of the whole population. Participants' quitting status was self-reported and not biologically verified, which might be a potential source of recall bias that clouds the evaluation of the treatment, especially because participants were contacted late after enrollment. As for measuring treatment characteristics, it is challenging to compare results of medication adherence with those from former studies because of the different approaches used to measure and report treatment adherence in various populations. The same goes for measuring motivation to quit which is assessed using different measurement scales across studies.^[34]

CONCLUSION

The findings of this study suggest that quit outcomes of smoking cessation are affected by factors across distinct levels. Adherence to treatment and compliance to the program are favorable in achieving PA. However, quit attempts and outcomes remain hampered in the absence of individual-level, provider-level, and system-level effective cessation interventions. Therefore, it is profoundly important to address and evaluate these factors in order to develop effective, accessible, and cultural-specific smoking cessation services.

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Ethical consideration

Ethical approval was acquired from the Institutional Review Board at the American University of Beirut. Before enrollment in the study, written informed consent was obtained from the SCP providers.

Declaration of interest

The authors declare that they have no competing interests.

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Conflicts of interest

There are no conflicts of interest.

Authors' contributions

MR and NK were responsible for conceptualization and management of the project. SK, SJ, and JAD were responsible for data management and analysis, manuscript write-up, and interpretation of findings. GH was responsible for qualitative interview, data transcription, and analysis. All authors have read and approved the manuscript.

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