



# Factors Associated with Tobacco Cessation in Primary Health Care

Ricardo Melnick<sup>1</sup>  Gabriela Soares Rech<sup>2</sup>  Rafaela Soares Rech<sup>3</sup>  Daniel Demétrio Faustino-Silva<sup>1</sup> 

<sup>1</sup> Graduate Program in Assessment and Production of Technologies for the SUS (PPGATSUS), Grupo Hospitalar Conceição (GHC), Porto Alegre, RS, Brazil

<sup>2</sup> Mathematics and Statistics Institute, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil

<sup>3</sup> Graduate Program in Epidemiology, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil

**Address for correspondence** Daniel Demétrio Faustino-Silva, PhD, Hospital Nossa Senhora da Conceição, Gerência de Ensino e Pesquisa, Av. Francisco Trein, 326, 91350-200, Porto Alegre, RS, Brazil (e-mail: ddemetrio@gmail.com).

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## Abstract

**Introduction** Cigarettes are the main cause of preventable death in the world, and primary health care services can contribute to the management of this habit.

**Objective** To describe and analyze the factors associated with tobacco cessation in groups of smokers in primary health care.

**Methods** The present is a cross-sectional study conducted in 12 primary health care units from July 2016 to May 2017. We investigated sociodemographic and health variables, as well as smoking characteristics and different interventions for tobacco cessation, with the outcome being studied and analyzed after the fourth group care session.

**Results** We evaluated 329 smokers, of which 182 quit smoking after the fourth interview. Most of the individuals who quit smoking were women ( $n = 121$ , 66.5%), with a monthly income of 2 to 5 minimum wages ( $n = 88$ , 77.9%). After the multivariable analysis, we observed that tobacco cessation was significantly associated with depression (prevalence ratio [PR] = 1.11; 95% confidence interval [95%CI] = 1.02 to 1.22), as well as with belonging to the groups which used as approaches motivational interviewing (PR = 1.21; 95%CI = 1.13 to 2.01), patches (PR = 1.36; 95%CI = 1.24 to 1.48), and bupropion (PR = 1.16; 95%CI = 1.03 to 1.31).

**Conclusion** Primary health care is the ideal site for the reduction of smoking rates, given that different technologies may be applicable and useful for tobacco cessation. The comprehensiveness and longitudinal care offered in primary care may provide opportunities for health professionals to understand which is the best technology for each health system user, thus contributing to personalized care.

## Keywords

- ▶ smoking
- ▶ tobacco
- ▶ primary health care

## Introduction

Smoking is considered the leading global cause of preventable death, and it is responsible for ~ 8 million deaths per year worldwide.<sup>1</sup> According to the United States Census

Bureau, from 1990 to 2012, most of the consumption of cigarettes per person and the highest smoking rates were more observed among adult men (> 18 years old). Under a historical analysis of the number of cigarettes smoked per person, there was an increase until 1960, its peak, when, due

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to the implementation of public policies and public health efforts, the numbers started decreasing. However, despite this reduction, smoking is an epidemic and a significant risk factor for public health.<sup>2</sup>

Smoking molded the illness patterns of the 20th century, increasing the rates of lung cancer and other cancer types, as well as chronic obstructive pulmonary disease, and contributing to the rise in cardiovascular illnesses insofar as the mortality by infectious diseases lowered progressively. The decline in mortality rates by lung cancer and cardiovascular diseases, notably in men, followed the drop in smoking rates started in the 1960s.<sup>2,3</sup> Over the years, much has been made evident from epidemiological and health research. The public health intervention paradigm was established, and the findings have been fundamental in the rise and fall of the smoking epidemic;<sup>4</sup> however, it is still necessary to understand the associations of the variables related to tobacco cessation, as well as to evaluate new technologies in the context of primary health care, the gateway to health services.<sup>5</sup>

Several pharmacological and non-pharmacological methods to aid tobacco cessation are available, and there is good-quality evidence for the efficacy of many of them.<sup>6</sup> As examples, there are the advice of physicians, nicotine replacement therapy,<sup>7,8</sup> and the use of bupropion<sup>9</sup> and varenicline.<sup>10</sup> There is also evidence that the combination of pharmacological and behavioral interventions help people quit smoking. Both pharmacological and behavioral methods are considered contributors to the global success rates.<sup>11</sup> Among the strategies that have been standing out is motivational interviewing, which is a communication method defined as “a style of counseling directed towards the individual to provoke change in behavior, helping them to explore and resolve the ambivalence.”<sup>12</sup>

Primary health care is a strategy capable of offering health services equitably and efficiently to organize the access to the health systems, and it is composed of essential attributes: first-contact access, longitudinality and comprehensiveness of the care, and the coordination of the care and its derivatives: family-centered care, community guidance, and cultural competence of the professionals.<sup>13</sup> Hence, investigating which are the strategies associated with a higher prevalence of tobacco cessation are of utmost importance, and will collaborate with primary care precepts, identifying the determining factors of tobacco cessation and of the reduction in the prevalence of smokers.

Thus, the present study has the objective of describing and analyzing the factors associated with tobacco cessation in groups of smokers in primary health care.

## Methods

The present is a cross-sectional study nested in a cluster-randomized community clinical essay, in which the health units were randomized and blinded, and divided into two groups: test (motivational interviewing) and control (conventional approach). The study was conducted at the Community Health Service of the Nossa Senhora da Con-

ceição hospital in Northern Porto Alegre, RS, Brazil, in the twelve primary health care units that compose this service. The teams in these units develop a multidisciplinary care work following the primary health care principles, and since 2005 they promote tobacco cessation groups following the norms of the Brazilian National Cancer Institute (Instituto Nacional do Cancer, INCA, in Portuguese) and the Brazilian Ministry of Health, who defined the group approach as a treatment strategy for tobacco dependence. Each unit conducts awareness and calling work, forming groups according to spontaneous attendance by the patients. They develop a cognitive-behavioral approach of at least four sessions, with this number possibly varying according to the context of the group or coordinating team. Besides, all twelve units are linked to the Smoking Program of the Community Health Service, which has coordination in its monitoring and evaluation sector, and have as a target the formation of at least one group per trimester, or at least three per year.

A sample calculation was performed to answer the research question of the randomized clinical essay, estimated from the results of the health units from 2014 and 2015, which were made available in the annual report.<sup>14</sup> Taking into account a possible loss, we considered an increase of 20%, a significance level of 5%, and a statistical power of 80%, resulting in a sample of 206 patients. In total, 329 smokers who participated in the smoking groups of the health units were investigated and analyzed in this cross-sectional study.

The groups of smokers who received the intervention counted with trained and capacitated professionals as per the literature by Miller and Rollnick<sup>15</sup> and Silva.<sup>16</sup> The control groups followed conventional methodologies already in use in the health unit, thus classified in contextual variable Group (intervention; control). Moreover, the users could also opt to take drugs as per clinical indication, such as patches (yes; no) and bupropion (yes; no). These possible interventions were analyzed as contextual exploratory variables in the theoretical conceptual model, in addition to gender (male; female), monthly income (up to 1 minimum wage; 2 to 5 minimum wages; and more than 5 minimum wages), self-report of cardiopathy (no; yes), self-report of stroke (yes; no), self-report of depression (yes; no), age they began smoking (up to 18 years old; > 19 years old), number of cigarettes the patient smokes per day (up to 1 pack; 1 to 2 cigarette packs; more than 3 cigarette packs), and the Fagerström test,<sup>17</sup> whose function is to measure and evaluate the degree of nicotine dependence, establishing a score from 0 to 10 through the sum of points attributed to each answer: 0 to 2: very low; 3 to 4: low; 5: average; 6 to 7: high; and 8 to 10: very high.<sup>18</sup> In order to be adjusted to the model, the Fagerström test scores had to be categorized as low (very low and low), average (average), and high (high and very high).

The absolute and relative frequencies of all study variables were calculated. Chi-Squared tests were performed for the dichotomic variables. The presence of multicollinearity of variables was assessed through estimations of the variance inflation factor (VIF), observing that the cutoff values are good (near 1), thus indicating that the variables are not multicollinear. Poisson regression with robust variance

was used to calculate the gross and adjusted prevalence ratios (PRs) for the outcome of having stopped smoking at the fourth smoking group session, which was associated with the socioeconomic and health variables, as well as the possible technologies to aid in tobacco cessation, considering a significance level of 95%. In the adjusted model, all variables analyzed were included in the final adjusted model, considering an exploratory analysis. The model adjustment was evaluated with the Hosmer and Lemeshow test. The data were analyzed using the Statistical Package for Social Sciences (SPSS, IBM Corp., Armonk, NY, US), version 19.0.

The research project was submitted to and approved by the Research Ethics Committee and Plataforma Brazil under CAAE no. 56902516.4.0000.5530, respecting the national and international ethical guidelines, notably resolution no. 466/12 of the Brazilian National Health Council of the Ministry of Health (Conselho Nacional de Saúde do Ministério da Saúde, CNS/MS, in Portuguese).

## Results

In the present study, 329 smokers who participated in smoking groups in primary health care were evaluated. Of the participants, 182 (55.31%) smokers quit smoking after the fourth group session. ► **Table 1** describes the sample characteristics, as well as the gross PRs. Most individuals who quit the habit of smoking were women ( $n = 121$ , 66.5%) with a monthly income of 2 to 5 minimum wages ( $n = 88$ , 77.9%). They claimed to not have cardiopathies ( $n = 133$ , 88.1%), not have suffered strokes ( $n = 138$ , 91.4%), and not have depression ( $n = 98$ , 64.9%). The age in which most of the smokers started smoking was  $\leq 18$  years old ( $n = 111$ , 76.0%), and they smoked around 1 pack of cigarettes per day ( $n = 100$ , 69.9%). The Fagerström score was high for most participants ( $n = 93$ , 51.1%). It was also found that most participants of the smoking groups made use of nicotine-replacement patches ( $n = 163$ , 89.6%) and did not use bupropion ( $n = 132$ , 72.5%).

Besides the sociodemographic characteristics, ► **Table 2** describes the PRs adjusted relative to quitting smoking after the fourth session of motivational interviewing. One may observe that there is a statistical significance ( $p < 0.05$ ) for smokers who presented cardiopathies (PR = 0.87; 95% CI = 0.75 to 1.01), had depression (PR = 1.11; 95% CI = 1.02 to 1.22), were part of the motivational interviewing approach group (PR = 1.21; 95% CI = 1.13 to 2.01), and used patches (PR = 1.36; 95% CI = 1.24 to 1.48) and bupropion (PR = 1.16; 95% CI = 1.03 to 1.31).

## Discussion

The prevalence of tobacco cessation after the fourth smoking group therapeutic session held in primary health care was of 182 (55.31%). Individuals with depression who were in the group that underwent the motivational interviewing approach, used patches, or made use of bupropion remained significantly associated with tobacco cessation. The characterization of sociodemographic variables and of the nicotine dependence of smokers is useful to guide the development of

tobacco cessation programs. Well-conducted programs are particularly important from the economic point of view because they increase tobacco abstinence and, consequently, may prevent a wide variety of chronic illnesses.

The assumption that the mental health of smokers with depression may worsen after abstinence is untrue, given that this relationship is not evident in the literature.<sup>19</sup> Moreover, the present study showed better tobacco cessation results in individuals with a diagnosis of depression when in group therapy, which may be due to the support and exchange of experiences among the participants. Likewise, depressive individuals must not be seen as users who are challenging to manage on account of their mental health condition.<sup>20</sup>

The positive association between tobacco cessation and the use of bupropion demonstrates the efficacy of the medication, as well as its interface with the indirect effect on the treatment of depression, which may be related to the significant results for the users with depression. Bupropion is an antidepressant that acts as a blocker of the reuptake of dopamine and noradrenaline, with dosages between 150 and 300 mg/day, just as the nicotinic medicines, which compose what is called nicotine replacement therapy (NRT), such as nicotine patches and chewing gum.<sup>21</sup> In the present study, the nicotine patch, which has the objective of alleviating the symptoms of craving smoking, also demonstrated a statistical significance. Added to the medication issues and their interfaces with depression, motivational interviewing may further empower the group participants to manage to establish their own change plan and fulfill it.<sup>22</sup> The quadrilateral formed by depression, bupropion, patch use, and motivational interviewing demonstrated a positive effect on tobacco cessation.

Corroborating the findings of the present research, a study<sup>23</sup> demonstrated the beneficial effect of the use of nicotine patches and bupropion. Besides, the authors<sup>23</sup> concluded that the pharmacological support, associated with cognitive-behavioral counseling, was fundamental for the obtention of the high abstinence levels in their study. Among the several strategies to promote behavior changes, a technique has the potential to be quite useful to the primary health care teams as a way to improve the results of interventions related to the cessation of smoking. Among the methods explored in the literature, there is motivational interviewing, which is a communication approach centered on the person, suited to mobilize the change concerning dysfunctional behaviors. When directed toward tobacco use, motivational interviewing is a smoker-focused approach that proposes to help resolve the ambivalences relative to smoking, to promote the success of the individual in changing behaviors related to cigarettes. During therapy, a communicative scenario must be built between the patient and the health professional to create a favorable reflexive listening environment, helping the participants in the verbalization of conflicts, fears, and expectations.<sup>24</sup> This process led to significant results in the present study.

Regarding the therapy developed in groups, it is known that groups are part of people's lives, and they are fundamental to socialization and emotional support.<sup>25</sup> The

**Table 1** Characteristics of the studied sample and gross prevalence ratios associated with tobacco cessation on the fourth therapeutic consultation

Variable	Yes (n = 182)	No (n = 147)	95% confidence interval	p-value
<b>Patient gender</b>				
Male	61 (33.5%)	39 (26.7%)	1	–
Female	121 (66.5%)	107 (73.3%)	1.05 (0.94–1.17)	0.374
<b>Monthly income</b>				
≤ 1 minimum wage	19 (16.8%)	19 (26.0%)	1	–
2 to 5 minimum wages	88 (77.9%)	53 (72.6%)	0.93 (0.84–1.04)	0.219
> 5 minimum wages	6 (5.3%)	1 (1.4%)	0.79 (0.64–0.98)	0.036
<b>Cardiopathy</b>				
No	133 (88.1%)	110 (93.2%)	1	–
Yes	18 (11.9%)	8 (6.8%)	0.87 (0.75–1.01)	0.071
<b>Stroke history</b>				
No	138 (91.4%)	114 (96.6%)	1	–
Yes	13 (8.6%)	4 (3.4%)	0.92 (0.71–1.20)	0.549
<b>Depression</b>				
No	98 (64.9%)	65 (55.1%)	1	–
Yes	53 (35.1%)	53 (44.9%)	1.11 (1.02–1.22)	0.021
<b>Age they began smoking</b>				
≤ 18 years old	111 (76.0%)	94 (81.7%)	1	–
≥ 19 years old	35 (24.0%)	21 (18.3%)	0.97 (0.87–1.08)	0.582
<b>Number of cigarettes smoked per day</b>				
≤ 1 pack	100 (69.9%)	70 (60.3%)	1	–
1 to 2 packs	39 (27.3%)	39 (33.6%)	0.98 (0.88–1.10)	0.763
≥ 3 packs	4 (2.8%)	7 (6.0%)	1.08 (0.92–1.28)	0.321
<b>Fagerström Score</b>				
Low	42 (23.1%)	27 (18.4%)	1	–
Average	47 (25.8%)	28 (19.0%)	0.97 (0.86–1.09)	0.640
High	93 (51.1%)	92 (62.6%)	1.03 (0.91–1.16)	0.611
<b>Approach group</b>				
Conventional	72 (39.6%)	79 (53.7%)	1	–
Motivational interviewing	110 (60.4%)	68 (46.3%)	0.91 (0.83–0.99)	0.047
<b>Patch</b>				
No	19 (10.4%)	78 (53.1%)	1	–
Yes	163 (89.6%)	69 (46.9%)	1.36 (1.24–1.48)	< 0.001
<b>Bupropion</b>				
No	132 (72.5%)	122 (83.0%)	1	–
Yes	50 (27.5%)	25 (17.0%)	1.16 (1.03–1.31)	0.019

evidence demonstrates that day-to-day life is marked by group experiences, given that individuals are always involved in relationships with other people, be it at work, at home, during leisure activities, and with friends. Based on this theory, it was observed that therapeutic groups with a cognitive-behavioral approach are efficient due to the relationship established and proposed in the group. During these moments, users value the group and feel valued by the other

members, building a stable, reliable, strong, and adequate therapeutic relationship, creating the opportunity for an effective therapy condition.<sup>26</sup> A study<sup>27</sup> demonstrated that the feeling of belonging to a group, of support and backing by the group is fundamental in therapeutic success. The sense of belonging to the group, the identification and cooperation are primordial in the success of the treatment. When the individual trusts the group, they feel more at ease to expose

**Table 2** Exploratory adjusted prevalence ratios of the contextual variables studied associated with tobacco cessation on the fourth therapeutic consultation

Variable	Prevalence ratio (95% confidence interval)	p-value
<b>Patient gender</b>		
Male	1	–
Female	1.05 (0.94–1.17)	0.374
<b>Monthly income</b>		
≤ 1 minimum wage	1	–
2 to 5 minimum wages	0.93 (0.84–1.04)	0.219
> 5 minimum wages	0.79 (0.64–0.98)	0.036
<b>Cardiopathy</b>		
No	1	–
Yes	0.87 (0.75–1.01)	0.071
<b>Stroke history</b>		
No	1	–
Yes	0.92 (0.71–1.20)	0.549
<b>Depression</b>		
No	1	–
Yes	1.11 (1.02–1.22)	0.021
<b>Age they began smoking</b>		
≤ 18 years old	1	–
≥ 19 years old	0.97 (0.87–1.08)	0.582
<b>Number of cigarettes smoked per day</b>		
≤ 1 pack	1	–
1 to 2 packs	0.98 (0.88–1.10)	0.763
≥ 3 cigarette packs	1.08 (0.92–1.28)	0.321
<b>Fagerström Score</b>		
Low	1	–
Average	0.97 (0.86–1.09)	0.640
High	1.03 (0.91–1.16)	0.611
<b>Approach group</b>		
Conventional	1	–
Motivational interviewing	1.21 (1.13–2.01)	0.027
<b>Patch</b>		
No	1	–
Yes	1.36 (1.24–1.48)	< 0.001
<b>Bupropion</b>		
No	1	–
Yes	1.16 (1.03–1.31)	0.019

their thoughts and beliefs. The feedback provided by the therapist and the group helps correct distorted cognitions and reinforces more realistic evaluations.<sup>27</sup>

Lastly, it is noteworthy that primary care is as an opportune scenario for the execution of smoking control actions. Primary health care organizes and rationalizes all the resources, both basic and specialized, directed toward the promotion, maintenance, and improvement of health.<sup>13</sup> Strengthening it with an emphasis on health promotion actions enables the improvement in the health status and the reduction of iniquities and costs.<sup>28</sup> Therefore, the fragmented services need innovative strategies that enable the execution of preventive actions in the community and its coordinated and comprehensive functioning.<sup>29</sup>

## Conclusion

We conclude that the more considerable tobacco cessation in therapeutic groups in primary health care is strongly associated with the use of the motivational interviewing approach, bupropion, nicotine patches, and with depression. In this sense, these variables must be considered by the professionals who handle smoking, thus promoting coordinated, humanized, and comprehensive care to the population of smokers.

### Authors' Contributions

RM, GSR, RSR and DDFS contributed to the study design, data analysis and interpretation, writing of the article, critical review of the intellectual content, and approval of the final version to be published.

### Conflict of Interests

The authors have no conflict of interests to declare.

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