

## ORIGINAL ARTICLE

# Real world evaluation of the smoking cessation services in the Rio de Janeiro municipality, Brazil

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Email: leticiac@inca.gov.br**Abstract****Introduction** In recent years, there has been a growing recommendation for process evaluation of the smoking cessation programmes in the world. This study sought to evaluate smoking cessation services, with special attention to the degree to which public health care facilities adhere to governmental standards of practice.**Methods** A cross-sectional study examined smoking cessation services by using a key-informant approach. All the services that delivered smoking cessation treatment in 2013 at the National Health System of the Rio de Janeiro municipality, Brazil, were included in the study. The treatment consists of group sessions and pharmacotherapy. Compliance with the standards of inputs, activities, and short-term outcomes was analysed. A descriptive analysis was performed using means and standard deviations for the continuous variables and absolute and relative frequencies for the categorical variables.**Results** Of the 177 services performing smoking cessation treatment in 2013, a total of 81.9% answered the questionnaire. More than 90% of the services met the infrastructure standards. Behavioural approach and pharmacotherapy were available in more than 99% of the services. Of a total of 11 287 patients aged 18 years or older who registered for treatment, 77.6% received tobacco cessation interventions during the first group session. Among those who had access to treatment, 52.8% were not smoking at the fourth group session.**Conclusion** Even though more than 20% of the patients did not attend the first group session, the access to treatment was high, and it was observed that the success rate of those who attended the fourth group session was more than 50%.**KEYWORDS**

cessation, evaluation, health services, primary health care, tobacco

## 1 | INTRODUCTION

Considered to be the main cause of preventable death in the world, smoking is responsible for about 5 million deaths every year. It is also associated with 12% of all deaths in people aged 30 years or older.<sup>1</sup> Current estimates indicate an increase in annual mortality among smokers, projecting 8.3 million deaths in 2030, in which 80% will occur in low- and middle-income countries.<sup>2</sup> Moreover, the decrease in productivity in smokers arising from premature illness and death has been associated with high costs in health care, leading to important economic charges for these countries. In this context, promoting smoking

cessation is one of the main interventions in public health to reduce morbidity and mortality throughout the world.<sup>3</sup>

In Brazil, smoking is more frequent among men than women in all regions of the country,<sup>4-6</sup> and higher consumption happens among those with lower education.<sup>6</sup> The prevalence of smoking in people 18 years or older has substantially decreased over the last 24 years: from<sup>7</sup> 34.8% in 1989, to values between<sup>6</sup> 10.8% and<sup>5</sup> 14.7% in 2013, according to the source of information consulted. Even though the methodologies of these studies are not comparable, the results point to a significant reduction in tobacco consumption in the last quarter century. However, with reference to the nicotine dependence

profile, between 2006 and 2011, a national study revealed a reduction in the proportion of adults who smoke 20 or more cigarettes a day only in the northeast region of the country, with no reduction in the other regions.<sup>8</sup> The implementation of cessation-related strategies (laws, warnings on the products about smoking damages, the creation and expansion of tobacco-free areas, restriction or prohibition of advertisements, prevention of initiation, and expansion of free access to effective methods of smoking cessation),<sup>9</sup> coordinated since 1989 by the Brazilian National Cancer Institute, the Instituto Nacional de Câncer, via the National Program for Tobacco Control, may be considered to be partly responsible for the decrease in smoking rates in Brazil.

Article 14 of the international Framework Convention on Tobacco Control (FCTC), a global public health treaty, refers to dependence and cessation of tobacco, and calls on member countries to facilitate the access and the availability of treatment for tobacco dependence through the implementation of large specific programmes, including the use of pharmaceutical products. Even though the guidelines explicitly recognise that the resources are finite and suggest gradual approaches, where appropriate, they also recommend that pharmacotherapy be available widely either at an affordable or at no cost. The Framework Convention on Tobacco Control recommends countries perform monitoring and evaluation of the activities, to measure the progress of the programmes and identify the impact of the proposed interventions. This monitoring and evaluation of the cessation-related strategies allow for measuring their progress, such that the interventions may be modified and improved whenever necessary to ensure the most efficient use of resources.<sup>10,11</sup>

Accordingly, in Brazil, treatment is offered for free by the National Health System, the Sistema Único de Saúde (SUS), and consists of a behavioural approach (brief counselling) and pharmacotherapy, when indicated. The first part comprises 4 weekly group meetings conducted by trained health care professionals; each group session lasts about 2 hours, and information about the consequences of smoking, abandonment methods, stages of change, benefits of cessation, tobacco withdrawal symptoms, coping strategies, and prevention of relapse is provided. Moreover, specific medication for smoking cessation treatment such as nicotine patch, nicotine chewing gum, nicotine tablets, and bupropion hydrochloride can be used. This cessation-related strategies are regulated by 3 government ordinances,<sup>12-14</sup> in which infrastructure standards, necessary resources and activities, and the monitoring indicators of short-term outcomes are defined.

In recent years, there has been a growing recommendation for process evaluation of the smoking cessation programmes. This type of evaluation aims to investigate, in a systematic way, the development of the programme, measuring inputs, activities, and short-term outcomes.<sup>15</sup> Besides, evaluating the adherence to Brazilian guidelines, it creates an opportunity for the improvement of health services, helping more smokers to quit.<sup>16</sup> However, the evaluations of the smoking cessation services are scarce in Brazil. In this context, this study sought to evaluate the smoking cessation services in the Rio de Janeiro municipality, during the period from January to December 2013, with special attention to the degree to which public health care facilities adhere to governmental standards of practice for tobacco dependence counselling and treatment.

## 2 | METHODS

A cross-sectional study was performed for individual smoking cessation services by using a key-informant approach. All the services from the SUS of the Rio de Janeiro municipality, Brazil, located in the southeastern region of the country, that delivered smoking cessation treatment in 2013 were included in the study. That year, the Municipal Health Secretariat of Rio de Janeiro had 283 services. Of these, 177 performed smoking cessation treatment during the year. The treatment consists of a behavioural approach (brief counselling) and pharmacotherapy, when indicated.

Between March and September 2014, an external independent evaluator using consistent methodology conducted an evaluation of tobacco cessation activities delivered in the year 2013. A semistructured questionnaire was self-administered to the health care professional responsible for the treatment of the smoker in each service. The questionnaire was created based on the government ordinances,<sup>12,14</sup> which defined the guidelines for the treatment of smokers in the country. The instrument was pretested in 2 nonparticipating locations. The main variables studied were related to demographic data from the respondents, existence of a place for individualised patient care and for group sessions, tensiometer, stethoscope, anthropometric scale, a reference laboratory for routine analysis, a manual on treatment for the smokers, available medications for smoking cessation treatment, degree of adherence of the smoker to the behavioural approach, and the compliance with the medication treatment protocol.<sup>12,14</sup> The instrument construction and the pretest have been described in full elsewhere.<sup>17</sup>

The application of the questionnaire was done via email (3 attempts with a 15-day gap in between) or, when there was no response to the emails, by phone (1 attempt). Following a low-response rate to initial attempts (12.4%), an additional printed questionnaire was delivered. The printed questionnaires and the informed consent form were delivered by hand to the health care professionals responsible for the treatment of smokers in the services. Data collection methods were standardised across services. Data related to the patients treated in each service were reported by the respondents based on each service's records. Access to treatment occurred on demand. The standards related to the inputs, activities, and short-term outcomes were evaluated, including an adaptation of the indicators of access, adherence, and success of treatment recommended in the latest government ordinance.<sup>14</sup>

These indicators were calculated by using the following formula: access to treatment, (number of patients in the first group session/number of patients registered) × 100; adherence to treatment, (number of patients who attended the fourth group session/number of patients in the first group session) × 100; success of treatment, (number of patients with self-reported nonsmoking/number of patients who attended the fourth group session) × 100.

The information was stored and analysed in the Statistical Package for the Social Sciences (SPSS 20). A descriptive analysis using measures of central tendency (mean and standard deviation [SD]) was performed for continuous variables and absolute and relative frequencies for categorical variables. Percentages were calculated based on valid data (ie, missing data were excluded).

## 2.1 | Ethical aspects

This study started after approval by the Brazilian National Cancer Institute and the Municipal Health Secretariat of the Rio de Janeiro ethics committees (CAAE no. 20896613.1.0000.5274—October 23, 2013 and CAAE no. 20896613.5.3001.5279—December 30, 2013, respectively). Data were collected after health professionals responsible for the treatment of smokers in each participating service signed the informed consent form.

## 3 | RESULTS

Of the 177 services providing treatment for smokers in 2013, a total of 81.9% answered the questionnaire. The nonresponse reasons included refusal (0.6%) and lack of a professional responsible for the treatment of smokers because of furlough, vacation, change, or relocation to another sector (17.5%). Even though the reasons for refusal were not documented, time limitation seems to have been the main cause.

Regarding the profile of the services, 42.8% were a Municipal Health Centre and 53.1% belonged to the Family Health Strategy, the *Estratégia de Saúde da Família* (ESF). The characteristics of the respondents revealed that 80.7% were female and 49.0% were nurses; the ages ranged from 25 to 69 years old (mean = 41.3 years; SD = ± 10.5).

In the 145 health services included in this study, 766 healthcare professionals received tobacco treatment training; 566 of them (73.9%) provided smoking cessation interventions in 2013. These professionals belonged to the following categories: nurse (25.4%), doctor (22.4%), dentist (16.3%), community health agent (16.1%), technical or nursing assistant (8.8%), pharmacist (4.1%), social worker (3.5%), and psychologist (3.4%). The median number of health care professionals per service ranged between 3.4 and 4.4 (median = 3.9; SD = ± 3.1).

Information concerning the scheduling need for clinical evaluation, the offer of consultation for the treatment of the smokers, the instruments for the registration of the consultation, the structure of the service, the call strategies for missing patients, and the follow-up of the patients are summarised in Table 1. More than 90% of the services met the infrastructure standards.

Educational and clinical activities related to the routine of the smoker offered by the services are shown in Table 2. Only 18.3% of the services did not perform the behavioural approach. On the other hand, the pharmacotherapy was available in 99.3% of the services.

As short-term outcomes, in 2013, 11 287 patients aged 18 years or older were registered to receive treatment at the health services participating in this study. Of these, 77.6% of them (8753/11 287) attended the first group session, 65.3% of them (5714/8753) attended the fourth group session, and 52.8% of them (4621/8753) were not smoking by the fourth group session. The percentage of access, adherence, and success of treatment was respectively, 77.6%, 65.3%, and 52.8%.

## 4 | DISCUSSION

In this study, covering 81.9% of the services performing smoking cessation treatment in 2013 in the Rio de Janeiro municipality, Brazil,

**TABLE 1** Routine at the health services for the smoker, Rio de Janeiro municipality, 2013

Variables	N	%
Prior scheduling need for clinical evaluation of the smoker		
Yes	123	85.4
No	21	14.6
Smoking cessation clinic offer		
In shifts or specially defined groups	133	91.7
Daily	11	7.6
Instruments for the registration of the consultation		
Paper or electronic medical records	131	90.3
Monthly or quarterly statistics	110	75.9
Registry book	84	57.9
Emergency care sheet	40	27.6
Structure of the service <sup>a</sup>		
Location for individual consultation	133	91.7
Location for group sessions	139	95.9
Availability of a tensiometer	131	90.3
Availability of a stethoscope	136	93.8
Availability of an anthropometric scale	131	90.3
Availability of the coordinator guidelines	137	94.5
Availability of the participant guidelines	138	95.2
Reference laboratory for routine analysis	131	90.3
Call strategy for missing patients		
Phone	129	89.0
Home visit	101	69.7
Follow-up time of the former smokers		
<6 months	31	21.4
From 6 to 12 months	74	51.0
>12 months	35	24.1
Not followed	5	3.4

<sup>a</sup>These items were mandatory until 2013 according to ordinance no. 442 of August 13, 2004.

more than 90% of the services met the infrastructure standards. Behavioural approach and pharmacotherapy were available in more than 99% of the services. Of a total of 11 287 patients aged 18 years or older who were registered for treatment, 77.6% received tobacco cessation interventions. Among those who had access to treatment, 52.8% were not smoking at the fourth group session.

More than 50% of the participant services were part of the ESF, a community-based approach to reduce inequalities in access and use of primary health care in the country.<sup>18</sup> The incorporation of cessation-related strategies in Brazil's ESF is part of the government's strategy for coping with chronic diseases. The evaluation of public health interventions is crucial for developing public health policies. To the best of our knowledge, this is the first Brazilian study aiming to evaluate the treatment of smokers offered by the SUS in a specific municipality. While the originality of our proposal is evident, the lack of similar

**TABLE 2** Current tobacco cessation interventions informed by the services, Rio de Janeiro municipality, 2013

	N	%
Educational Activities		
Educational material distribution	137	94.5
Lectures	129	89.6
Use of educational posters	126	86.9
Conducting educational campaigns	107	73.8
Video projections	91	62.8
Educational activities in the waiting room	88	60.7
Walking group	58	40.0
Clinical Activities		
Initial clinical evaluation	144	99.3
Behavioural approach	116	81.7
Pharmacotherapy	143	99.3
Nicotine patch	144	99.3
Nicotine chewing gum	103	71.5
Bupropion hydrochloride	103	71.0
Nicotine tablets	94	65.3

publications prevented us from discussing our results considering other Brazilian studies.

Sherman et al pointed out that, even though the national smoking cessation practice guidelines have recommendations on the structure and process evaluation, the services rarely measure aspects related to structure.<sup>16</sup> In this study, the inputs, the activities, and the short-term outcomes of smoking cessation services have been analysed according to the recommendations of the Centers for Disease Control and Prevention.<sup>15</sup>

Service compliance with the standards related to the inputs for individual care and group sessions was observed in more than 90% of the services, such as a specific location for individual consultation and for group sessions, availability of reference services to perform additional exams, equipment and resources for clinical evaluation of the smoker such as tensiometer, stethoscope, and anthropometric scale, and availability of the coordinator guidelines and the participant, which are necessary requirements for a health service to be accredited for the treatment of smokers in the government ordinance.<sup>12</sup>

On the other hand, concerning the cessation-related strategies, there was variation between 40% (for walking group) and 94.5% (for educational material distribution). Clinical activities were not developed except by only one of the services. The percentage of cessation resources such as kits and brochures for 18 Veteran Administration facilities<sup>16</sup> varied between 13% and 25%, while in this study, it was over 60%. In the study mentioned, the percentage of clinics using medicines routinely ranged between 93% and 100%,<sup>16</sup> values close to those recorded in this study (99.3%). As for the medicines available, the percentages described in this study were slightly higher than those reported elsewhere for a nicotine patch (90%) and nicotine chewing gum (53%); however, they were lower than those reported for bupropion hydrochloride<sup>16</sup> (85%). On the other hand, the behavioural approach was available in more than 80% of the services, which was more than the one described in the Boston primary care services.<sup>19</sup> Certainly, this is due to one of the

ministerial ordinances regulating the treatment of smokers requires that before pharmacotherapy can be recommended, the smoker must participate in the brief cognitive-behavioural approach.<sup>12</sup>

Finally, concerning the short-term outcomes, it is noteworthy that 66.9% of the registered patients attended at least 1 group session. For those who did not attend the scheduled date, one can speculate that service dates did not meet the patients' needs, or the service was not accessible by the time the patients looked for it. In another study performed at Campinas State University (São Paulo, Brazil), of the 281 patients who searched for treatment, only 46.3% attended the first consultation,<sup>20</sup> which was lower than in this study. The reasons given by the authors for nonadherence were difficulty in finding time (27%), personal health problems (8%), or difficulty in obtaining transportation (5%). According to a National Health Research performed in 2013 in a representative sample of all Brazilian states, in the 12 months before the interview, 8.8% of the smokers aged 18 years or older sought a health care professional for quitting treatment; of the people who tried to quit smoking, 73.1% participated in treatment with a health care professional,<sup>5</sup> a percentage close to this study conducted in the same year. Still, there was a high percentage of dropouts between the first and the fourth group sessions: 34.7%, depending on the MPA. Another study performed in the south region of Brazil showed similar data: only 33.1% of the patients completed the 4 group sessions.<sup>21</sup>

In England, when monitoring the stop smoking services, the percentage of smokers enrolled who quit smoking in 4 weeks was used as an indicator, and the standard for success rates was fixed between 35% and 70%,<sup>22</sup> values that were similar to those described in this study, in which abstinence at the end of 4 weeks was 52.8%. In another study conducted in England, in which 3 smoking cessation services models were compared, this percentage ranged between<sup>23</sup> 46.8 and 63.3%. A population study performed in Denmark including 17 439 patients showed that after 6 months, the smoking cessation rate was 32%. In the study, more than 90% of the patients received 5 face-to-face sessions and supportive medications over 6 weeks, and the cessation rate increased with the number of sessions attended.<sup>24</sup> In the study performed at Campinas State University (São Paulo, Brazil), the smoking cessation rate was 66% among those who completed the 4 weeks of motivational group activity,<sup>20</sup> a figure similar to the one observed in some services analysed in this study. In Brazil, public policies for tobacco control have been implemented over the last 30 years. Comprehensive and effective measures such as policies for increasing taxes and prices of tobacco products, a ban on smoking in public indoor places, mandatory warnings in cigarette packs, and advertising bans on all type of media<sup>25</sup> are somewhat advanced when compared to other developing and developed countries. The increasing adherence to government standards of practice may explain, at least partially, these results. However, from a research point of view, future studies must investigate in more depth the factors associated with the access, adherence, and success of the treatment of smokers in Brazil.

The results of this study should be interpreted in the context of its limitations and strengths. Although this service evaluation covered 81.9% of the smoking cessation services in the Rio de Janeiro municipality, at first, when the questionnaire was sent via email, only 12.4% of the services joined the research. This scenario was reversed when printed questionnaires were delivered by hand. In a study related to

women's health, response rates were 17.9% in the group whose questionnaire was sent via the Internet and 73.2% when the remittance was printed. When the participants were contacted again and could choose between the 2 versions of the questionnaire, the response rates reached<sup>26</sup> 64.2% and 76.5%. In an anonymous survey sent via mail to analyse doctors' compliance with tobacco-treating guidelines, the response rate was 67%, less than the one observed in the present study, even considering that 3 reminders were sent during a 2-week interval.<sup>27</sup> In another study, the response rate of the service providers reached 96% when the questionnaire was sent via mail, with a reminder to the nonrespondents 2 weeks later, followed by 2 emails with 2-week intervals.<sup>19</sup> Even though recent reports have shown that digital surveys are more time and cost efficient than paper surveys,<sup>28</sup> the disappointing results presented here demonstrate the existence of barriers when answering a survey online, pointing to the need for thinking carefully when choosing strategies to ensure high-response rates in future research. The results of treatment success could have overestimated the real results, since the analysis included only patients who reached the fourth group session. In another Brazilian study, the success rate among the patients who started the treatment but did not attend the fourth group session was<sup>2</sup> 17%. It is important to highlight that this is not a randomised controlled clinical trial; as a real-world evaluation, researchers face limitations concerning the availability of time of participants and financial resources for the investigation, not to mention the not negligible percentage of missing data. Therefore, instead of reflecting the success of the treatment in ideal conditions, it shows the impact of the smoking cessation treatment in real conditions.<sup>29</sup> Another limitation is that the respondents were asked about situations and interventions that happened several months earlier, in the previous year, which may have caused inaccuracy in the information because of a possible recall bias. Further, there was no validation of the dropout rates using biochemical markers of exposure to tobacco. However, the difference between the self-reported dropout and the confirmed dropout by biological markers has been considered minor by other authors.<sup>24</sup> Another limitation is that the patients were not followed after the end of the treatment, and the measure of treatment success was only made at the fourth group session, which could have inflated the dropout rate, since there could have been relapses during the weeks following treatment completion. Similarly, the degree of nicotine dependence was not analysed.

As strengths, the relatively high adherence of the services (81.9%) must be highlighted, ensuring the internal validity of the results. It should be noted that these values were obtained only because of the described strategies used to increase adherence to the research. Nevertheless, the results should be interpreted with caution when generalised to other Brazilian municipalities with different population characteristics, types of exposure to tobacco products, and smoker treatment standards. Another limiting fact for generalisation of the results is that the interviews were conducted exclusively on the SUS and, therefore, cannot be extrapolated to private services.

The evaluation of smoking cessation services is essential to be able to offer the best protocol and care to smokers with the best use of public resources. The evaluation considering the service characteristics and the cessation-related strategies performed are essential and can contribute to the adequacy of monitoring the attention to chronic

diseases and the formulation of public policies in the areas of promotion, surveillance, and health care and, finally, the improvement of health conditions amongst the population.

## 5 | CONCLUSION

In this study, adherence to governmental standards by the smoking cessation services was superior to 90% for infrastructure and superior to 80% for clinical care standards. Even though more than 20% of the 11 287 patients registered for treatment did not attend the first group session, the access to treatment was high (66.9%), and the success rate of those who attended the fourth group session was more than 50%.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest. The authors alone are responsible for the content and writing of this paper.

## ETHICAL APPROVAL

This study was approved by the Brazilian National Cancer Institute and the Municipal Health Secretariat of the Rio de Janeiro ethics committees (CAAE No. 20896613.1.0000.5274 - October 23, 2013 and CAAE No. 20896613.5.3001.5279 - December 30, 2013, respectively).

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