TREATMENT OF SMOKING ADDICTION AT A UNIVERSITY HOSPITAL: IMMEDIATE RESULTS AND RESULTS AFTER ONE YEAR OF FOLLOW-UP

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ABSTRACT

Smoking is a chronic disease and despite the existing therapeutic resources relapse is still high. The aim of this study was to analyze immediate treatment results and results after one year of follow-up for smokers treated at a university hospital and to evaluate the factors related to relapse. A total of 175 patients who participated in the Tobacco Treatment Program group between March 2012 and November 2015 were evaluated. Most patients had a high or very high degree of nicotine dependence. At the end of the sessions, 137 patients had ceased smoking (immediate abstinence rate of 78.3%). Among the analyzed variables, only medication use was significant in the immediate cessation. After one year of treatment, 76 (55.4%) of the 137 patients who had ceased smoking remained abstinent. Degree of dependence was a significant risk factor for relapse, whereas the use of medication did not contribute to its prevention. The high rates of immediate abstinence and abstinence after one year are possibly related to the approach of the multidisciplinary team, telephone call follow-up, and pharmacological treatment. However, a significant proportion of smokers relapsed over the long term. It is important to identify the individual characteristics and factors associated with increased relapse.

KEYWORDS: Prevention; Nicotine; Cessation.

1. INTRODUCTION

Smoking is considered a chronic disease that is subject to relapse and remains a critical public health problem that results in preventable deaths worldwide. Although 70% of smokers claim they would like to stop smoking, less than 10% stop on their own. As a result, there has been a gradual increase in the demand for cessation support actions, which highlights the importance of health institutions and professionals in terms of their approach to smoking[1]. Several treatment options are available; however, cessation rates vary significantly[2].

Some studies show higher smoking cessation rates after 4 weeks of treatment[3]. However, research has demonstrated that relapse rates are high when monitored over the long term[4].

Intensive treatment programs have higher success rates than brief interventions. Studies of brief counseling by health professionals associated with nicotine replacement therapy demonstrated an abstinence rate of approximately 10% after 1 year[4]. Treatments involving intensive cognitive behavioral therapy associated with pharmacological treatment achieved a 20-30% cessation rate after one year[4,5,6].

Relapse is a common event among former smokers. Seventy-five percent of smokers who are abstinent 4 weeks after cessation relapse within one year (mostly in the first six months) regardless of the nature of the initial intervention[4,7].

Few studies have evaluated long-term abstinence rates. Many services have encountered difficulties in monitoring patients over a longer period because of the lack of trained professionals for treatment, lack of administrative capacity, poor patient compliance with discontinuation of medication and difficulties in maintaining telephone contact[2,7]. The nicotine use disorder belongs to the various substance use disorders group. The treatment for these disorders should be similar to the treatment for chronic diseases with continued medical follow-up.

To guide public health interventions to increase long-term smoking cessation rates, a better understanding of smoking abstinence and relapse is needed. The aim of this study was to evaluate the immediate treatment results and the results after 1 year of follow-up of smokers monitored at a university service and to investigate the factors related to relapse.

2. MATERIAL AND METHODS

The study resulted from the experience of the Smoking Addiction Support and Treatment Clinic of the Antônio Pedro University Hospital, Fluminense Federal University (RJ, Brazil) during the period from March 2012 to November 2015.

During the initial evaluation, patients were interviewed and information was collected using a questionnaire. This questionnaire was standardized according to the National Cancer Institute's guidelines and aimed to evaluate the patient's sociodemographic characteristics, current and previous medical history, smoking history and psychiatric history. The degree of nicotine dependence was characterized according to the Fagerström Test score[8].

After the initial interview, the patients underwent a medical evaluation including complementary tests (blood count, biochemistry, chest radiography and spirometry). They were subsequently referred for treatment in a group performing cognitive behavioral therapy sessions. On average, the group comprised 15 to 20 people who participated in six weekly morning sessions lasting one hour and thirty minutes. During the sessions, aspects of dependence and nicotine withdrawal were discussed, cognitive interventions and behavioral skill training that aimed at immediate cessation and relapse prevention were performed, and testimonials of former smokers who had participated in previous groups were presented. The study included patients who participated in at least four of the six sessions. The medications used were nicotine replacement therapy (NRT), bupropion and varenicline. These treatments were distributed free of charge on a weekly basis during treatment.

A patient who stopped smoking after 6 sessions was considered an immediate success. Long-term success was defined as abstinence for a period of one year. Failure was defined as patients who did not stop smoking despite treatment. Relapse was considered to be a return to smoking at any point after cessation.

All patients were evaluated by telephone as to their smoking status in the first, third, sixth and twelfth months after the end of the group treatment.

This study was approved by the Research Ethics Committee of the School of Medicine of the UFF.

Means, standard deviations, medians, and minimum and maximum values were used as the continuous variables, and simple frequency distributions and percentages were used as the discrete variables. The nonparametric X^a test (Chi-square) was used to compare the discrete variables between the three groups. The arithmetic means of the groups were used as follows: the Snedecor F test for analysis of variance, Student's t test for continuous variables, and the non-parametric Kruskal-Wallis and Mann-Whitney tests when the continuous variables showed wide variation. Relative risk values were calculated according to the study variables. A significance level of 5% probability ($p < 0.05$) was adopted.SPSS software version 17.0 was used to perform the analysis.

3. RESULTS

Of the 175 patients studied, 120 (68.6%) were female with a mean age of 51.4±8.9 years (range: 23-76 years). Most participants (67.4%) had completed at least high school. One hundred and one (57.7%) patients lived alone and 74 (42.3%) lived with a companion (Table 1).

Table 1. Demographic characteristics and smoking history of smokers in the sample.

Variables	n = 175
Sex n(%)	
Female	120 (68,6)
Male	55 (31,4)
Average age in years	51,4 ± 8,9
Scholarity n(%)	
A	3 (1,7)
B	28 (16)
C	26 (14,8)
D	76 (43,4)
E	42 (24,0)
Marital Status n(%)	
Married	74 (42,3)
Single	44 (25,1)
Others*	57 (32,6)
Average of cigarettes/day	25,0 ± 13,0
Smoking beginning, years	15,9 ± 4,0
Smoking length, years	35,1 ± 9,8
Smoking load, packs/year	44,9 ± 27,9
Degree of nicotine dependence n(%)	
Very low/low	29 (16,6)
Medium	28 (16,0)
High/very high	118 (67,4)
Family history smoking n(%)	
Yes	140 (80,0)
No	35 (20,0)
Previous attempts to cease smoking n(%)	
0	51 (29,1)
1 or 2	98 (56,0)
3 or 4	17 (9,7)
5 or more	9 (5,1)

A: Illiterate; B: Incomplete elementary middle school; C: Complete elementary middle school/incomplete high school; D: Complete high school/incomplete higher education; E: Completed higher education* Divorced, widowed or separated. Source: Patients participating in the HUAP smoking treatment group

With respect to smoking history, the majority (67.4%) of the patients who sought the program had a high or very high degree of nicotine dependence. The mean number of cigarettes smoked was 25.0±13.0 cigarettes/day and the mean smoking duration was 35.1±9.8 years with a mean smoking history of 44.9±27.9 packs/year. The mean age at the onset of smoking was 15.9±4.0 years (range: 9-36 years). Most (56.0%) of the patients had previously made one or two attempts to cease smoking, and 80.0% had a family history of smoking (mother, father and/or sibling)

(Table 1).

At the beginning of the group, the reasons reported for wishing to cease smoking were health problems (121 patients), family (41), improvement in quality of life (29), social (17), financial (8), the smell of cigarettes (7), aesthetics (6) and religion (1). Some patients had more than one reason.

Of the 175 patients, 154 (88.0%) were treated pharmacologically. The medications used were NRT/patch (99 patients), patch associated with bupropion (22), varenicline (21), bupropion (12) and NRT/patch and gum (01). The median pharmacological treatment time was 90 days.

At the end of the six sessions, 137 patients had ceased smoking (immediate abstinence rate of 78.3%), whereas the treatment was unsuccessful for 38 (21.7%) patients. After one year of treatment, 76 (55.4%) of the 137 patients who had stopped smoking remained abstinent, whereas 61 (44.6%) returned to smoking (Table 2).

Of these, 39 (64.0%) relapsed within the first 3 months, 13 (21.3%) between the 4th and 6th months and 9 (14.7%) between the 7th and 12th months. The median time to relapse was approximately 129±73 days. The reasons cited for relapse were family (27 patients), emotional (25), uncontrollable desire (9), health problems (6), financial (1), living with smokers (1) and weight gain (1). Some patients had more than one reason.

Table 2. Outcomes of immediate treatment and after one year of follow-up

Outcomes	Immediate success (after 06 sessions)	Long-term success (Abstinence for a period of 1 year)
Abstinent	137 (78,3%)	76 (55,4%)
Not ceased	38 (21,7%)	–
Relapsed	–	61 (44,6%)
Total	175 (100,0%)	137 (100,0%)

Source: Patients participating in the HUAP smoking treatment group.

Regarding the analyzed variables, there was a significant difference in terms of age and smoking duration among the groups that had immediate success and those that did not cease smoking. The group that stopped after 6 sessions was older and had smoked for longer ($p \leq 0.01$). However, no differences were observed regarding gender, education, marital status, number of cigarettes smoked per day, age at start of smoking, degree of dependence, previous attempts to cease smoking and family history of smoking. The pharmacological treatment influenced immediate success and was a facilitative factor in smoking cessation, with a RR of 0.09 (95% CI: 0.03; 0.25) and p <0.01 (Table 3).

Table 3. Relative risk estimate of variables related to immediate success.

Variables	RR	CI 95%	P
Sex	1,27	0,60 – 2,70	p = 0.525
Age	1,33	0,55 – 2,38	P = 0,588
Marital Status	1,79	0,84 – 3,84	p = 0.131
Scholarity	0,78	0,34 – 1,80	p = 0.559
Family history	1,43	0,55 – 3,75	p = 0.463
Medication use	0,09	0,03 – 0,25	p < 0.001
Smoking length	1,58	0,76 – 2,08	p = 0,463
Nicotine dependence	2,08	0,89 – 4,91	p = 0.087
Cigarettes/day	1,21	0,58 – 2,53	p = 0.614
Smoking load (packs/year)	0,51	0,24 – 1,09	p = 0.081
Previous attempts to cease	1,18	0,52 – 2,71	p = 0.689

Table 4. Relative risk estimate of variables related to relapse.

Variables	RR	IC 95%	P
Sex	0,74	0,36 – 1,55	p = 0,427
Age	1,12	0,76 – 2,08	p = 0,642
Marital status	1,54	0,78 – 3,05	p =0,213
Scholarity	0,95	0,45 – 2,00	p =0,889
Family history	0,83	0,36 – 1,88	p =0,647
Medication use	1,07	0,23 – 4,99	p =0,927
Smoking length	1,40	0,66 – 2,11	p = 0,606
Nicotine dependence	2,48	1,19 – 5,19	p =0,014
Cigarettes/day	1,60	0,79 – 3,25	p =0,191
Smoking load (packs/year)	1,00	0,51 – 1,98	p =0,984
Previous attempts to cease	0,86	0,38 – 1,96	p =0,718

Source: Patients participating in the HUAP smoking treatment group.

When comparing the group of patients who relapsed with the group remaining abstinent after one year, there was a significant difference only in the degree of dependence, which was higher in the patients who relapsed. Degree of dependence was a significant risk factor for relapse with an RR of 2.48 (95% CI: 1.19; 5.19) and p <0.014, whereas the use of medication did not help to prevent relapse (p = 0.92) (Table 4).

4. DISCUSSION

In this study, the sociodemographic data and smoking history were similar to those found in national and international studies where there was a predominance of women with an average age of approximately 50 years who started smoking at approximately 15 years of age and who had a smoking habit lasting more than 30 years[9,10,11,12,13,14,15,16,17]. In a study performed in several European countries, Fagerström et al. found that the demand for smoking cessation support was higher in females and ranged between 54 and 65%[18]. The predominance of women seeking smoking cessation support groups can be

related to their greater ease in recognizing health problems, their willingness to seek expert help to solve these problems and their greater availability to attend at the times when treatment is offered. These data also reflect a new reality where there is paradoxically an increased perception of risk and yet at the same time increased smoking behavior among women[19].

It has been reported in the literature that a low level of education is associated with a higher prevalence of smoking, early onset of smoking and prolonged maintenance of nicotine dependence[13]. However, in this study, most patients had completed at least a high school education, and a large portion of the sample was composed of health professionals working at the university hospital. These results corroborate those of a survey conducted at a specialized clinic in São Paulo city in which the authors also found that more than 50% of the patients had a high level of education; this finding was attributed to the possibility that smokers who sought support for smoking cessation were generally those with greater access to information, especially with regards to healthcare[14].

Practice has shown that over 50% of smokers who seek specialized centers have a high degree of dependence[9,10,12,14] and most refer to previous smoking cessation attempts[12,15,16,20], which was also observed in this study.

The main motivating factors for smoking cessation reported by patients were concerns about health, family, and improved quality of life. Other studies have also noted the relevance of these factors, especially problems related to health[10,12,15,20]. These data reinforce the importance of the health professional as a motivator in the smoking cessation process, especially for patients who are still in a pre-contemplative stage[16]. There is evidence showing that the healthcare professional's approach has a great impact on the patient's attitude[21]. Associating the pathology leading them to seek treatment for smoking or merely raising questions in this regard can perhaps subconsciously kick start the patient's motivation and lead to life-changing habits.

Currently, there are various types of resources that can be used to treat smoking: counseling, self-help material, cognitive behavioral therapy and pharmacological treatment. Several studies have shown that medication use increases the rate of immediate cessation[5,11,14]. In a systematic review published in 2013 on studies of pharmacological interventions for smoking cessation, Cahill *et al.*[22] analysed 267 trials covering more than 101,000 smokers and concluded that NRT, bupropion and varenicline all improve the chances of quitting, with a low risk of harms. The outcome for benefit was continuous or prolonged abstinence at least six months from the start of treatment. In a more recent systematic review (2016) Stead *et al.* [23] found that combined pharmacotherapy and behavioral interventions had greater success compared to minimal interventions. In this study, medication was administered to most patients and was also a factor that contributed to the immediate success of the treatment.

Several studies have shown that high nicotine dependence is associated with an increased risk of immediate therapeutic failure[5,11]. However, in this study, this association was not statistically significant.

Despite treatment being widely available, smoking cessation rates may vary significantly between different centers[2]. Knowledge of immediate abstinence rates and the rates after a year of treatment are extremely important for evaluations of the effectiveness of anti-smoking treatments. In this study, the immediate abstinence rate was 78%, which was similar to the rate found in Azevedo *et al.*'s study[10] that evaluated smokers treated in the psychoactive substances clinic of the Clinics Hospital of the State University of Campinas (HC/UNICAMP/SP/BRAZIL) and that reported an abstinence rate of 79%. Lower rates, approximately 40%, have been reported in national and international studies[4,5,6,11].

In this study, patients who ceased smoking were older and had smoked for longer than those who did not cease smoking. Younger patients have been reported to be more difficult to help and should receive different treatment[4,24].

Nicotine dependence is a chronic disorder. If the patient is not enrolled in a relapse prevention program, the possibility of returning to smoking is great[7]. After one year, abstinence rates decline to 25-30%[5,6,20].

In this study, the abstinence rate was 55.4% in the one year follow-up, which was similar to the rate reported by Sales *et al.*[17] and Azevedo *et al.*[10] and greater than the rate reported by other authors[4,12]. In a study of smoking addiction treatment services in England, Ferguson et al.[4] observed an abstinence rate of approximately 17.7% in a one year follow-up.

Smoking relapse rates are high. Most patients relapse within the first six months[4]. In this study, most patients relapsed within the first 3 months with a progressive decrease in the relapse rate with the passage of time similar to that reported in other studies[4,20,25,26]. Hawkins *et al.*[25] showed that the percentage of relapse decreased as the abstinence time increased, which was also reported by Hughes *et al.*[26] in a meta-analysis of smoking relapse after 1 year of abstinence. These data demonstrate the need for greater support during the first months of smoking abstinence.

Predictive eventual relapse factors vary between different services. Several studies[25,27,28] found that being married, being older and a having higher level of education were significantly associated with a lower risk of relapse. Fernandez *et al.*[29] observed that individuals with low education relapsed twice as often as those with higher levels of education. Puente *et al.*[24] showed that gender was not a predictive factor for relapse, which was similar to the findings of this study. However, some studies have shown that women have a higher relapse rate compared to men, which can possibly be attributed to concerns about weight gain and higher rates of depression after smoking

cessation[20]. In the present study, only degree of dependence was a significant risk factor for relapse. The greater the degree of dependence is, the greater the possibility of the occurrence and/or severity of withdrawal symptoms during smoking cessation and the more difficult it becomes to maintain long-term abstinence.

The measures necessary for relapse prevention are not yet clear. A meta-analysis of 54 randomized controlled trials concluded that there was insufficient evidence that any behavioral intervention was effective in relapse prevention to date[30,31]. There is weak evidence that pharmacological intervention is effective in preventing relapses when used for an extended period by patients who achieved initial therapeutic success[31]. Gonzales *et al.*[2] found no difference in relapse rates in patients treated with varenicline, bupropion and placebo. However, in a randomized controlled clinical trial, Tonstad *et al.*[32] provided treatment with varenicline over an extended period of time (24 weeks) and observed greater long-term abstinence rates. In a systematic review of 36 studies evaluating the effectiveness of relapse prevention interventions, Agboola *et al.*[31] demonstrated that the use of NRT, bupropion and varenicline seemed to be effective for relapse prevention. However, cognitive behavioral therapy proved ineffective. In this study, the use of medication was related to greater immediate success rates but did not contribute significantly to relapse prevention.

5. CONCLUSION

In conclusion, the high immediate abstinence rates found in this study are possibly related to the use of medication and to the multidisciplinary team's actions, especially in terms of the systematic telephone follow-up, which is a relapse prevention measure. However, a significant proportion of smokers relapsed in the long-term. Thus, it is important to identify the individual characteristics and factors associated with increased relapse. This study confirms that smoking treatment services should offer long-term support, especially for ex-smokers with a high degree of dependence.

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