General hospital admission as an opportunity for smoking-cessation strategies: a clinical trial in Brazil

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Abstract

Objective: To compare the results of 6-month follow-ups for hospitalized patients who were divided into two groups of low- and high-intensity treatments for smoking cessation and compared to the results of standard hospital treatment.

Methods: A total of 2414 patients were screened. Two hundred thirty-seven current smokers were randomly assigned to high-intensity intervention (HII; 30-min motivational interview plus seven routine telephone calls after hospital discharge) or to low-intensity intervention (LII; 15-min counseling about the benefits of quitting) and 80 comprised the usual care (UC) group. Six months after hospital discharge, all participants were contacted by phone. The main outcome measure was smoking cessation.

Results: The smoking-cessation rates were 44.9%, 41.7% and 26.3% for the HII, LII and UC groups, respectively (P = .03). The multivariable analysis identified the following variables which are associated with the failure to stop smoking: the absence of a tobacco-related disease (TRD), younger age and a low motivation for cessation at the initial contact.

Conclusions: There was a great difference between intervention and nonintervention. The LII had an impact similar to the HII. The variables associated with no smoking cessation demonstrate the need for more personalized interventions for smokers who present lower indexes of motivation, are younger and do not have smoking-related diseases.

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1. Introduction

Approximately 15-25% of medical and surgical inpatients are smokers [1,2]. Tobacco-related diseases (TRD) constitute one of the main reasons for all general hospital admissions [3]. During hospital stays, patients should be advised to stop smoking because this decision has been related to reductions in morbidity and mortality [4]. Nevertheless, the use of psychoactive substances has been frequently ignored in this population, and general internists often discharge patients from tertiary care without sufficiently addressing opportunities for smoking prevention [1,5].

A Spanish study indicates that, although 19% of inpatients are currently smokers, less than a third remembered having been asked about smoking during their stay in hospital. The study therefore concludes that smoking cessation is still not a priority in hospitals [6].

Hospitalization, especially for a TRD, may boost a patient’s receptivity to smoking-cessation interventions. Many hospitals restrict or prohibit patients from smoking to protect the other patients and staff from the effects of passive smoking. This smoke-free environment may also provide an opportunity for hospitalized smokers to attempt to abstain from smoking. For this reason, providing (or at least initiating) tobacco dependence treatments in hospitals may be an effective preventive health strategy [7,8].
To our knowledge, no Brazilian studies to date have investigated the effects of smoking-cessation interventions in a sample of patients admitted to a general hospital. This study compared the results of 6-month follow-ups for hospitalized patients who were divided into two groups of low- and high-intensity treatments, respectively, for smoking cessation. These results were also compared to the results of standard hospital treatment.

2. Methods

2.1. Design and setting

This article presents a randomized clinical trial with smoking inpatients which was conducted in a public university hospital. Smoker patients were randomly allocated to two intervention groups: low-intensity intervention (LII) or high-intensity intervention (HII). Six months after being discharged from hospital, all participants received a follow-up telephone call and were reassessed.

The 394-bed hospital, affiliated with the Campinas State University, is the most specialized medical center available to approximately 5 million people living in the metropolitan area of the city of Campinas, Brazil. In the year 2009, 326,000 people were seen at the outpatient clinics, 13,600 people were hospitalized and 13,300 surgeries were performed. The average length of stay was 8.4 days. The hospital is a smoking-free environment [9].

2.2. Subjects

Between October 2007 and June 2008, the research team approached 2414 (85.1%) out of 2837 patients aged 18 years or older consecutively admitted to the hospital wards, with the exception of the intensive care and psychiatric units. In the case when a patient was admitted multiple times in this period, only their first hospital admission was considered.

The criterion for inclusion in this smoking-cessation trial was a patient report of a smoking habit of at least one cigarette smoked daily immediately prior to hospital admission. Twenty-four individuals (1%) declined to participate in the screening, and 337 (13.9%) were excluded (reasons given in the flowchart in Fig. 1). Among them, 55 smoker patients who presented with alcohol use disorders (AUD) were assigned to a trial on treatment strategies for AUD which was being conducted at the same time of the current study.

Of the 353 individuals who fulfilled the inclusion criteria, 273 were randomly assigned to either the LII or the HII group. Eighty patients who were identified as smokers could not be approached again because of early hospital discharge. As these patients were lost to randomization, they received assistance according to the norms that prevail in the hospital. (Typically, the study hospital does not provide routine mental health assessment or treatment.) The hospital staff was responsible for the treatment decisions according to usual hospital practice. This means that this latter group, called the “usual care” (UC) group, received no specialist counseling for smoking cessation while hospitalized.

For a significance level of 95% (two-sided) and a power of 90% — assuming 20% and 50% smoking cessation in the LII and HII groups, respectively — it would be necessary to follow-up with a total of 228 subjects after 6 months.

2.3. Screening interview

The screening interview was conducted at the patient’s bedside within 72 h of admission. All participants answered a questionnaire comprising sociodemographic items and self-report instruments, described below, all of which previously validated in general hospital settings in Brazil.

Smoking was assessed by a single question: “Have you smoked daily during the previous month?” Individuals who smoked at least one cigarette a day were considered smokers and asked to complete the Fagerström Test for Nicotine Dependence (FTND) [10]. This is a standard method for assessing the intensity of nicotine dependence on a scale of low (score <4), moderate (4–6) and severe (≥7) [3].

The patient’s wish to stop smoking was assessed with a self-report 10-point scale anchored by 0 (no wish) and 10 (very strong) which asked: “How strong is your wish to stop smoking?”

The Hospital Anxiety and Depression Scale (HADS) comprises 14 multiple-choice items on anxiety and depression [11]. Whenever a patient’s score was equal to 8, or above, in each subscale, a “case” of anxiety, or depression, was determined. This cut-off point corresponds to the criteria previously adopted by a local validation study [12].

The Alcohol Use Disorder Identification Test (AUDIT) comprises 10 multiple-choice items that identify the risk of hazardous and harmful alcohol use when its score is equal to 8 or higher [13,14].

The Charlson Comorbidity Index (CCI) [15,16] was originally designed to measure the risk of 1-year mortality that is attributable to comorbidity using a longitudinal study of patients admitted to general hospitals. Its contents and weighting scheme are based on Cox proportional risk modeling. Two senior researchers reviewed the patients’ charts and independently coded the baseline CCI and the presence of TRDs [17,18]. Any disagreements were solved by consensus. Information about the reasons for hospital admission (coded according to ICD 10) and current treatment was also collected from patient charts.

Screening interviewers were available every workday of the recruitment period. Twenty medical students were trained to administer the screening questionnaire. This training consisted of three 2-h modules, which comprised introductions, role-playing interviews and two practice interviews with patients under the supervision of the main research team. All items of the self-report assessments were read aloud by the interviewer to every patient to control for potential illiteracy or poor schooling. No inter-rate reliability assessment was performed.
2.4. Randomization and intervention

Within 48 h of the initial screening, a smoking-cessation counselor interviewed each smoker patient. In this interview, information on the patient’s smoking habit was gathered. Following this step, each patient was randomly assigned to one of two treatment groups when the counselor opened the envelope that contained the patient’s allocation.

An allocation sequence based on a random-number table was used to randomly assign all enrolled subjects to either LII or HII. The allocation was maintained in a serially numbered, opaque envelope, which was opened at the Phase 2 interview to prevent counselor bias. The subjects were blind to their assignments to the specific treatment groups. In the consent form, subjects were asked to agree to a follow-up without specification of the number and time of follow-up contacts. This information was given only after subjects had been randomly assigned to their groups.

The LII consisted of a 15-min session of individual counseling session in which a trained smoking-cessation counselor advised patients to “stop smoking.” The counselor reviewed the dangers of smoking and the benefits of quitting; furthermore, the counselor suggested that, after being discharged from hospital, the patient should seek help to stop smoking.

The HII consisted of a 30-min session of individual counseling by a trained smoking-cessation counselor, who performed a motivational interview [19,20] with the patient. This style of interview was tailored to the patient’s specific goals for quitting smoking. The counselor reviewed the dangers of smoking and the benefits of quitting, assessed the participant’s knowledge and beliefs about smoking cessation and provided counter-arguments to potential barriers to cessation. This intervention also included a discussion of behavioral self-management techniques to counter known relapse triggers such as stress, the presence of other smokers and anxiety.

In both LII and HII, patients were advised to seek help for smoking cessation after they were discharged from hospital. They received no smoking-cessation pharmacotherapy during hospitalization or on discharge to home.
After discharge, the same counselor who had conducted the motivational interview contacted the HII group patients for seven follow-up telephone calls according to a specific timeline over 6 months (at 1, 2 and 3 weeks, and at 1, 2, 3 and 4 months). Each call lasted approximately 10 min. It was an opportunity to reinforce motivation for stopping smoking (or maintaining abstinence). The style of the interview was in line with the motivational interview performed during hospitalization.

Six months after hospital discharge, all participants (i.e., from the LII, HII and UC groups) were contacted by telephone and reassessed using a standardized form. The main outcome measure was smoking cessation, as determined by self-reported abstinence (7-day point prevalence abstinence). The assessment was made by the same counselor who had made the initial interview and follow-up contacts.

All of the smoking-cessation counselors who participated in the study (four psychologists, two nurses and one occupational therapist) had specialist postgraduate training in motivational and smoking-cessation therapy. They had been practicing smoking-cessation therapy for at least 2 years and were actively involved in the hospital’s outpatient clinic for the treatment of nicotine dependence.

2.5. Data analysis

LII and HII groups were compared using the chi-square and Kruskal–Wallis tests for categorical and continuous variables, respectively. Multivariate logistical regression analysis with stepwise selection was used to obtain a discriminate profile of the patients who reported that they continued to smoke at the 6-month follow-up. Variables with \( P \leq 0.20 \) in the univariate analysis were included using a stepwise selection algorithm, combining the features of forward selection and backward elimination. After the first variable was entered, the value of the criterion was reevaluated for all variables not in the model, and the variable with the largest acceptable criterion was entered next. At this point, the variable entered first was reevaluated.
to determine whether it met the removal criterion. If it did, it was removed from the model. The odds ratios (OR) were obtained and the respective 95% confidence intervals were calculated (95% CI). The statistical program used was SAS (Statistical Analysis System) version 8.02.

For the purposes of statistical analyses, the variable occupational status was grouped according to the following criteria: economically active (full-time, part-time and temporary employees), economically inactive (unemployed, on leave of absence because of ill health or retired) and housewives. Other variables were recoded in dichotomous format, as shown by the results in the tables.

An institutional research ethics committee approved this study. All individuals enrolled agreed to participate and signed a consent form. No kind of financial assistance or incentive was offered to the participants.

3. Results

The baseline characteristics of the participant patients, organized by treatment group, are shown in Table 1. A higher proportion of surgical patients and a lower proportion of TRDs were both observed in the UC group. Smoking characteristics were similar in the three groups (Table 2).

Overall, 62 (17.6%) individuals could not be contacted for follow-up (LII=24, HII=34, UC=4). This attrition was mostly due to address change (n=32), death (n=28) and re-hospitalization (n=11). Ninety-seven percent of the telephone calls scheduled for the HII group were completed for those patients who completed the study.

Table 3 shows the outcome at the time of the 6-month follow-up assessment. LII and HII produced similar proportions of smoking cessation (41.7% and 44.9%, respectively) as opposed to the 26.3% of patients who stopped smoking in the UC group.

Among those who were continuing to smoke when they were contacted for the 6-month follow-up assessment, the number of cigarettes smoked daily was lower in the HII. The profile of these individuals was obtained by means of a multivariate regression analysis, the results of which are shown in Table 4 (only results that were statistically significant on the final multivariate model are shown).

4. Discussion

This study reports on the treatment of hospitalized smokers in a different context than has been seen in the literatures to date which have drawn almost exclusively on hospitalized population in North America and Europe. This is the first Brazilian study to describe and evaluate different approaches to smoking cessation in smokers, focusing on both the in-hospital and post-discharge time periods. The results validate the benefits of opportune interventions during a hospital admission.
4.1. Smoking cessation in a “teachable moment”

The attrition rate of patients from the study at the 6-month follow-up was similar to other international studies [8,21] which showed rates from 12% to 18%. Curiously, there was a greater attrition rate from the HII group, which, at least partially, could suggest a negative effect from the more intensive intervention. This phenomenon deserves to be evaluated in future studies to establish the ideal frequency of contacts for subgroups of patients who are better or less suited to more intensive approaches.

After 6 months in the study, the smoking-cessation rate in the UC group (26.3%) was higher than the rate reported in the literature for spontaneous cessation (approximately 5%) [22]. It is possible that the cessation rate in our UC group may have been partly due to the recruitment process itself, as the screening questionnaire conveyed to the staff concerns about the patient’s smoking habit. However, this rate was similar to the cessation rate found in other follow-up studies after the discharge of patients submitted to interventions, especially smoking patients who presented TRD [23], but was significantly lower than the cessation rate obtained in the intervention groups (41.7% in LII and 44.9% in HII).

Other studies have already pointed out similar smoking-cessation rates that result from more or less intensive interventions for hospitalized patients because the interventions took place in the context of hospitalization. These studies suggest that hospitalization can contribute to the smoker’s perception of his vulnerability, thus creating an ideal “teachable moment” for a change in behavior [24,25].

Even though the smoking-cessation rates for both groups of intervention (LII and HII) were very close, the HII group presented significantly superior reductions in the number of cigarettes smoked daily after 6 months in comparison to the LII. Although there is no evidence to support the hypothesis of reducing smoking damage, it is nevertheless true that a decrease in the number of cigarettes smoked daily is considered a path toward cessation [26]. At the 6-month follow-up, patients in the HII group also presented significantly lower rates of seeking smoking-cessation treatment. In view of these results, we can ask whether the more intensive intervention replaced the patients’ search for treatment because the patients considered the frequent phone contacts an intervention of care.

4.2. Failure to stop smoking

The multivariable analysis identified three variables associated with the failure to stop smoking (noncessation) at the 6-month follow-up: the absence of a TRD, a younger patient age and a low motivation for cessation at the initial contact.

Other studies [8,27] have already shown that TRD presence and particularly the instructions given to patients on the relationship between smoking and their disease increase potential cessation rates after discharge. Another variable associated with noncessation was a younger patient age; this result has also been reported in another study [28]. This result points to an important factor in cessation, which is that older patients, who present greater smoking-cessation rates after intervention, are less frequently targeted for interventions for smoking cessation by health professionals when compared with younger smokers [27]. The result of this study points to the need for a cultural change in the way smoking-cessation interventions are viewed; they should be seen as valid for patients of all ages.

The third variable related to noncessation was a low motivation for cessation at the initial contact. The import-

### Table 3

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Usual care (%)</th>
<th>Low-intensity intervention (%)</th>
<th>High-intensity intervention (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>291</td>
<td>76 (26.1)</td>
<td>108 (37.1)</td>
<td>107 (36.7)</td>
</tr>
<tr>
<td>Stopped smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>113</td>
<td>20 (26.3)</td>
<td>45 (41.7)</td>
<td>48 (44.9)</td>
</tr>
<tr>
<td>No</td>
<td>178</td>
<td>56 (73.7)</td>
<td>63 (58.3)</td>
<td>59 (55.1)</td>
</tr>
<tr>
<td>Number of cigarettes smoked daily (median)</td>
<td>291</td>
<td>10</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Received smoking-cessation specialist therapy^c</td>
<td></td>
<td></td>
<td></td>
<td>.001^b</td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>9 (12)</td>
<td>5 (4.6)</td>
<td>2 (1.9)</td>
</tr>
<tr>
<td>No</td>
<td>273</td>
<td>66 (88)</td>
<td>103 (95.4)</td>
<td>104 (98.1)</td>
</tr>
</tbody>
</table>

^a Chi-square test.  
^b Kruskal-Wallis test.  
^c Received public health care services during post-discharge period, as the patient’s option.

### Table 4

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OR</th>
<th>OR^a 95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tobacco-related disease</td>
<td>1.43</td>
<td>1.05–1.94</td>
<td>.02</td>
</tr>
<tr>
<td>Young age (18-35 vs 51-62 years old)</td>
<td>1.53</td>
<td>1.01–2.33</td>
<td>.04</td>
</tr>
<tr>
<td>No wish to stop smoking at baseline^b</td>
<td>1.06</td>
<td>1.01–1.13</td>
<td>.04</td>
</tr>
</tbody>
</table>

^a Odds ratio 95% confidence interval.  
^b Scored 0 on the 10-point scale (see Methods).
smoking comorbidity together with alcohol abuse or dependence were excluded to avoid participation in two interventions at the same time; such a scenario would limit the possibility of obtaining accurate results. Randomization has only been done for the two intervention groups (LII and HII) and not for the UC group. Thus, bias and confounding could be relatively strong in the latter, which consisted of individuals detected as smokers by the screening but who did not undergo randomization because of early hospital discharge. When the profiles of the intervention groups and the UC group were compared, significant differences were not found for the majority of characteristics. Only two differences were identified in the groups. The UC patients presented greater rates of current admission for surgery. This factor may explain their earlier discharges because some patients were probably admitted for elective surgeries, which require a less average hospitalization time. There was also a greater prevalence of TRD in the LII group, and this difference might explain the elevated rate of smokingcession in that group. It is known that the presence of a TRD increases the patient’s motivation to stop smoking [30]. The remaining similarities between the groups allowed researchers to compare the interventions results (HII and LII) and the usual care results in a balanced way.

No inter-rater (counselor) check was conducted to determine whether there were differing counseling styles. On the other hand, all counselors had had the same specialist postgraduate training in smoking-cessation therapy in the study institution. Interview style in both LII and HII was trained and conducted according to a written protocol and was the same one adopted at the hospital outpatient clinic where the counselors had been previously trained.

A further limitation stems from the evaluation of smoking cessation. It was made by an assessor who was not blind to the treatment group, and this circumstance might increase the risk of biased responses. It should be kept in mind that social desirability may have influenced the results, as some participants did not want to disappoint their counselor. We used the patient’s self-report over the phone, without the confirmation by biological measures such as cotinine dosage. The latter is partially justified if we consider that many of the patients lived in other cities and therefore found it difficult to travel to the main hospital. This circumstance is especially significant because the majority of them suffered from serious bodily illnesses with consequent physical limitations.

Pharmacotherapy was not included either in the LII or in the HII group because of two reasons: intervention was not conceived as a treatment per se. Patients were encouraged to engage in a treatment for smoking cessation after hospital discharge. Additionally, Brazil has developed a strategy for smoking cessation based upon intensive support— including pharmacotherapy — delivered in accredited treatment units. This can provide quality assurance but also creates a barrier to patients living far from such units, as was the case with several of our patients. Besides, central control and distribution of medications have also resulted in delays and interruption of treatments [31].

The profile of the evaluated hospitalized smokers was similar to the profile found in other studies [32–35]. Subjects were predominantly men who suffered from anxiety and depression, and whose use of psycho-medicines exceeded the average use of nonsmoking adults. The data also indicate a concentration of people in their 50s experiencing serious clinical pathologies, which justified admission to a university main hospital; this fact was corroborated by the high CCI at baseline and the high mortality rates in the follow-up. The characteristics of the population studied indicate a potential exception for the extrapolation of this study’s results to populations in other contexts.

The variables associated with smoking noncessation demonstrate the need for more personalized interventions for smokers who are admitted to general hospitals, particularly those who present lower indexes of motivation, are younger and do not have smoking-related diseases. The interventions used in this trial (especially the low-intensity arm) are likely generalizable and could serve as a useful model for other centers in Brazil and for further study.

References


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