ORIGINAL ARTICLE

Nicotine dependence in a group of cigarette consumers in the Cerro municipality

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ABSTRACT

Introduction: smoking is a worldwide health problem and a major cause of disability and death. Nicotine is the main psychoactive ingredient in tobacco and causes dependence. Cigarette smoking is related to the development of respiratory and cardiovascular diseases and neoplasms; the risk increases with early onset, amount and frequency of exposure and with the coexistence of other toxic habits.
Objective: to characterize nicotine dependence in smokers in the Cerro Municipality.
Methods: a descriptive, cross-sectional study was carried out, in which the Fagerström test was applied to 30 cigarette consumers in the Cerro Municipality.
Results: the study was dominated by male smokers over 50 years of age and the coexistence of other toxic habits and chronic diseases. An early onset of the habit was observed, consumption of more than 20 cigarettes a day predominated and the duration of consumption was between 20 and 40 years, for a majority degree of medium-high dependence.
Conclusions: the pattern of consumption found, the association with other toxic habits and chronic diseases and the predominance of medium-high dependence predispose these smokers to a decrease in life expectancy and to face greater difficulties to quit smoking in case of being submitted to some strategy of smoking cessation.
Key words: nicotine; smoking; tobacco use

RESUMEN

Introducción: el tabaquismo es un problema de salud a nivel mundial y una causa importante de discapacidad y muerte. La nicotina es el principal ingrediente psicoactivo del tabaco y causante de la dependencia. El consumo de cigarrillos está relacionado con la aparición de enfermedades respiratorias y cardiovasculares y de neoplasias; el riesgo aumenta con el comienzo temprano, la cantidad y la frecuencia de la exposición y con la coexistencia de otros hábitos tóxicos.
Objetivo: caracterizar la dependencia a la nicotina en fumadores del Municipio Cerro.
Métodos: se realizó un estudio descriptivo, de corte transversal, en el que se aplicó la prueba de Fagerström a 30 consumidores de cigarrillos del Municipio Cerro.

Resultados: en el estudio predominaron los fumadores varones mayores de 50 años y la coexistencia de otros hábitos tóxicos y de enfermedades crónicas. Se observó un comienzo temprano del hábito, predominó el consumo mayor de 20 cigarrillos al día y la duración de consumo entre 20 y 40 años, para un grado mayoritario de dependencia media-alta.
Conclusiones: el patrón de consumo encontrado, la asociación con otros hábitos tóxicos y con enfermedades crónicas y el predomino del grado de dependencia media-alta predisponen a estos fumadores a una disminución de la esperanza de vida y a confrontar mayores dificultades para dejar de fumar en caso de ser sometidos a alguna estrategia de deshabituación.
Palabras clave: nicotina; tabaquismo; uso de tabaco

INTRODUCTION

Although tobacco has been an article of commerce for hundreds of years, it began to be a major addictive substance only in the 20th century. Nicotine is the main psychoactive ingredient and is responsible for nicotine dependence; cigarettes and other tobacco preparations can be considered as instruments for nicotine delivery.[1]
The binding of nicotine to nicotinic receptors in the brain facilitates the release of dopamine and other neurotransmitters; with continued exposure to nicotine, neuroadaptation of the receptors occurs, leading to dependence, tolerance and withdrawal symptoms when blood levels fall.[1,2] Clinically, the smoker experiences sensations ranging from mild stimulation to vague relaxing sensations. It changes mood, produces pleasure, releases anxiety, improves task performance, decreases hunger, and accelerates body metabolism (weight reduction).[1,2]
Tobacco and its combustion smoke give off more than 4,000 chemical substances: 400 are highly toxic substances, about 50 are carcinogenic and 12 are toxic gases. The reinforcing effects of nicotine induce the activation of the brain reward system that motivates the likelihood of repeated consumption. Nicotine has been found to be one of the most addictive psychoactive substances because a considerable percent of users become dependent.[1,3]
Exposure to these is related to the appearance of several diseases: chronic bronchitis, pulmonary emphysema, arrhythmias, coronary and cerebrovascular diseases, hypertension, peripheral vascular diseases, dyspepsia and deficits in the sense of taste and smell; alterations in fertility and sexual potency, intrauterine growth retardation of the fetus, low weight of the newborn, premature birth and higher perinatal mortality are also described. It also increases the occurrence of different types of cancer (lung, trachea, bronchus, mouth, tongue, larynx, esophagus, pancreas, liver, breast, prostate and bladder).[1,2]
Tobacco consumption exerts its most serious effects in the long term, but short-term alterations can also be observed: increased colds, coughing and expectoration, fatigue, loss of appetite, dryness, grayish coloration and premature aging of the skin, stains or yellowing of the nails, fingers and teeth, halitosis, dental caries and alterations in heart rhythm.[1,2]
The risk of health damage increases considerably and a number of factors play a role: starting smoking at an early age and maintaining it, the intensity and frequency with which tobacco smoke is inhaled, the number and type of

cigarettes consumed, and exposure to other harmful substances such as toxic gases, radiation, environmental pollution, diet and eating habits.[4,5]

Smoking is a worldwide public health problem and a major cause of disability and death. The World Health Organization (WHO) considers smoking as an epidemic that generates great global concern; in view of this fact, it highlights the importance of strategies to offer help in smoking cessation, which reinforces the need for research that evaluates the smoking habit as a general exploration prior to the smoker's therapeutic approach. Among the elements to be evaluated, aspects such as nicotine dependence, motivation to quit, psychosocial behaviors in relation to the habit and other general complementary explorations are described.[4,5,6]

In the assessment of nicotine dependence, the most widely used scale is the Fagerström Test for Nicotine Dependence (FTND); its first version was established in 1978 and consisted of an eight-question self-report questionnaire. Studies have been carried out to validate the psychometric properties of the questionnaire and there is a version established by Fagerström himself in 1991, in which the questions were reduced to six.[7,8,9]

In Cuba, 24 out of every 100 Cubans smoke and it is one of the countries in the Americas with the highest exposure of children and adults to second-hand smoke, both at home and at work, according to data from the III National Survey on risk factors and preventive activities for non-communicable diseases. Only six out of 10 smokers want to quit smoking, 65% of those who smoke have made an attempt to quit and only one out of 10 who try to quit have received help to do so. The survey also showed that educational efforts by physicians and nurses to systematically and effectively recommend smoking cessation are infrequent.[10]

In this context, research is needed to serve as a basis for the design of effective smoking cessation, health promotion and prevention programs based on the characterization of consumption patterns and the different factors associated with smoking. The behavior of this dependence in the Cerro Municipality, where the "Salvador Allende" Faculty of Medical Sciences is located, is unknown, so characterizing nicotine dependence in smokers is the objective of this work.

METHODS

A descriptive, cross-sectional study was carried out. The selection criteria were established as being a smoker and accepting to participate in the study. The group was formed by 30 cigarette consumers of the Cerro Municipality, Havana City, selected by a non-probabilistic intentional sampling during the period from September 2019 to March 2020, who attended a smoking cessation consultation. General data were taken from the consumers, to whom the Fagerström test was also applied as an instrument to determine physical dependence to nicotine (Table 1).

Study variables

Age
Sex
Personal pathological history (APP, Antecedentes patológicos personales)

Time of consumption
Toxic habits
Number of cigarettes per day
Time between awakening and first cigarette smoked
Cigarette most difficult to omit
Higher consumption in the early morning hours
Smoke even if sick
Difficulty not to smoke in forbidden places

Table 1. Fagerström test

Question	Answer	Score
How long after waking up do you start smoking?	Up to 5 minutes 6 - 30 minutes 31 - 60 minutes > 60 minutes	3 2 1 0
Is it difficult to quit smoking in places where it is prohibited (libraries, hospitals, movie theaters, etc.)?	yes No	1 0
Which cigar is most difficult for you to skip?	First of the day Others	1 0
How many cigarettes do you smoke daily?	> 30 21 - 30 11 - 20 < 11	3 2 1 0
Do you smoke more in the morning than during the rest of the day?	Yes No	1 0
Do you smoke even if you are sick?	Yes No	1 0

Equivalence: one pipe=three cigars; one small cigar=three cigars; one large cigar=five cigars

Procedures, data collection and management, statistical analysis

The degree of dependence was established according to the sum of the score obtained in each of the questions of the Fagerström test.[7,8,9] In the six-indicator questionnaire, the items were answered in two different ways: three with dichotomous answers (yes or no) and the other three according to a four-point Likert-type scale (from zero to three). The total score was obtained from the sum of the points obtained in each indicator and considered the degree of low dependence (from zero to three points), the degree of medium dependence (from four to six) and the degree of high dependence (from seven to 10 points).

To process the information, a database was created in the Microsoft Excel application of the Microsoft Office 2016 system. Descriptive statistics such as Average, median and standard deviation were used to summarize the information on quantitative variables; for all qualitative variables, absolute frequencies and percentages were calculated. The association between variables was performed using the Chi-square test, with a p=0.05. The results were presented in tables and graphs. The statistical software used was SPSS 25.

Ethical considerations

The research respected the postulates and principles of ethics. Participants were asked for their consent and were informed of the objectives of the

research. The information obtained will not be used for purposes other than those expressed within the framework of the research. The primary data were handled with complete confidentiality during the research.

RESULTS

The average age was 48 years, ranging from 17 to 74 years, and there was a higher proportion of smokers in the age group over 50 years (53.3%). Male sex predominated in the sample.
Table 2 shows the distribution of tobacco users according to their PPPs. The most frequently referred chronic diseases were diabetes mellitus, AHT and bronchial asthma.

Table 2. Distribution of tobacco users according to APPs

Presence of APP	Frecuencia	%
Diabetes mellitus	8	53.3
Arterial hypertension (AHT)	7	46.7
Asthma	3	20.0
Migraine	2	13.3
Hepatitis	1	6.7
Allergy	1	6.7
Myopia	1	6.7
Total	**30**	**100**

Table 3 shows that toxic habits associated with coffee and alcohol consumption were reported by more than half of the respondents.

Table 3. Distribution of tobacco users according to intoxicating habits

Toxic habits		Frequency	%
With at least one toxic habit	Yes	27	90.0
	No	3	10.0
Coffee		9	33.3
Coffee+alcohol		18	66.7

n=30

The median age of onset of use was 17 years, with a predominance of early onset and long duration of use (Table 4).

Table 4. Distribution of tobacco users according to age of onset and time of use

Age of onset and time of use		Frequency	%
Edad inicio (años)	< 20	20	66,7
	≥ 20	10	33,3
	Median (minimum; maximum)	17 (10; 52)	
Tiempo de consumo (años)	< 20	9	30.0
	20-40	15	50.0
	> 40	6	20.0
	Average±DE (minimum; maximum)	29±16 (3; 64)	

n=30

As for the relationship between the behavior of the participants, the Fagerström test in Table 5 showed a predominance of consumption in the first half hour after waking up, the impossibility of abstaining from the first cigarette in the morning and not facing difficulties in smoking in prohibited places. In addition, cigarette consumption ranged from medium to high and the period of highest consumption was in the evening. It was observed that more than half of the smokers gave up the habit in case of illness.

Table 5. Behavior of tobacco users according to the answers of the Fagerström test

Question	Answer	Frequency	%
How long after waking up do you start smoking?	> 60 minutes	7	23.3
	31 - 60 minutes	3	10.0
	6 - 30 minutes	9	30.0
	Up to 5 minutes	11	36.7
Is it difficult for you to quit smoking in places where it is prohibited?	No	26	86.7
	Yes	4	13.3
Which cigarette is most difficult for you to skip?	Others	12	40.0
	First of the day	18	60.0
How many cigarettes do you smoke daily?	< 11	6	20.0
	11 - 20	10	33.3
	21 - 30	8	26.7
	> 30	6	20.0
Do you smoke more in the morning than during the rest of the day?	No	21	70.0
	Yes	9	30.0
Do you smoke even if you are sick?	No	18	60.0
	Yes	12	40.0

Table 6 shows the relationship between the degree of dependence and sex. More than half of the male smokers presented low dependence, while in the female sex the percentages of the three degrees of dependence behaved similarly.

Table 6. Distribution of patients according to degree of dependence and sex

Degree of dependency/gender		Low		Average		High		Total	
		N	%	N	%	N	%	N	%
Gender	Masculine	10	52.6	4	21.1	5	26.3	19	63.3
	Feminine	4	36.4	3	27.3	4	36.4	11	36.7
Total		**14**	**46.7**	**7**	**23.3**	**9**	**30.0**	**30**	**100**

X^2=0,745, p=0.689 (not significant)

Table 7. Distribution of patients according to the degree of dependence and age of onset of use

Degree of dependence/onset age		Low		Average		High		Total	
		N	%	N	%	N	%	N	%
Age of onset (years)	< 20	8	40.0	4	20.0	8	40.0	20	66.7
	≥ 20	6	60.0	3	30.0	1	10.0	10	33.3
Total		**14**	**46.7**	**7**	**23.3**	**9**	**30.0**	**30**	**100**

X^2=2,857, p=0,240 (not significant)

The relationship between the degree of dependence and the age of initiation of consumption is shown in Table 7. In subjects who started using before the age of 20, the percentages of low and high dependence were equal. More than half

of those who started at 20 years of age or older had a low degree of dependence.

In relation to the degree of dependence and time of consumption of the participants in the study, it was observed that more than half of the subjects with less than 20 years of consumption and between 20 and 40 years of age presented low dependence, while there was a predominance of high dependence in consumers over 40 years of age (Table 8).

Table 8. Distribution of tobacco users according to degree of dependence and time of use

Degree of dependence/ time of consumption		Low		Average		High		Total	
		N	%	N	%	N	%	N	%
Time of consumption	< 20	5	55.6	2	22.2	2	22.2	9	30.0
	20-40	7	46.7	4	26.7	4	26.7	15	50.0
	> 40	2	33.3	1	16.7	3	50.0	6	20.0
Total		**14**	**46.7**	**7**	**23.3**	**9**	**30.0**	**30**	**100**

X^2=1,608, p=0,807 (no significativo)

DISCUSSION

It is important to emphasize that the characterization of smokers, knowledge of their level of nicotine dependence and personalized intervention have been described as indicators for an effective detoxification strategy.[4,5]

The study found a higher frequency of smoking in men, which is consistent with what has been reported in other research.[10] The reinforcing effects of nicotine induce activation of the brain reward system that motivates the likelihood of repeat consumption. Nicotine has been found to be one of the most addictive psychoactive substances because a considerable percentage of users become dependent.[1,2]

The results on average age are more difficult to contrast because most of the studies reviewed use specific populations such as students at different levels of education or workers and certain age groups; unlike this study, which does not make these distinctions. Some overlap has been found with a study conducted in Spain in patients positive for COVID-19.[11]

In an investigation, the coexistence of diabetes mellitus, arterial hypertension and bronchial asthma was observed, although in a lower proportion than that observed in this group of smokers in which these diseases were predominant.[11] In another study carried out in a Health Area of the City of Cárdenas, Matanzas Province, similar results to these were recorded in terms of arterial hypertension and bronchial asthma, but the incidence of diabetes was lower.[12] A difference was observed in a study carried out in people over 35 years of age in a Health Area of Camagüey Province in which malnutrition by default and COPD were the most frequent antecedents.[13] In the study, the presence of chronic noncommunicable cardiovascular and respiratory decompensated diseases were the cause for these smokers to attend the smoking cessation consultation because they already presented difficulties to develop a normal life and to carry out their work and social activities. This disability at middle age is an important indicator because the mean age was 48 years and at that age one is of working age and socially active. In the studies reviewed there is no reference to this disability indicator related to the

decompensation of chronic diseases and the age of the consumers. The behavior of other diseases associated with smoking does not present relevant results.[11,12,13]

The high number of tobacco users who also consume alcohol and coffee is worrisome. This corresponds to what has been reported because legal drugs are the most widely used, which entails the risk that their status as gateway drugs may stimulate the use of illegal drugs in those with more vulnerable lifestyles; the significant existing social tolerance and the low perception of the risk associated with the consumption of alcoholic beverages have contributed to the generalization of their use and to a normalization of this behavior.[10,13,14,15]

Early onset of cigarette smoking is a strong prognostic factor in relation to nicotine dependence and the probability of quitting regular consumption.[10,14] The relationship increases directly with the age at which the processes of experimentation and consolidation of regular tobacco consumption occur.[10,14] The median age of 17 years for the onset of consumption observed in this study coincides with that reported in the literature in which ages between 17 and 20 years are referred to for this variable.[14]

Something similar occurs with the time of consumption as with the age variable: it is difficult to contrast the results due to the differences in the design. Tobacco consumption increases by 70% the risk of dying prematurely from related diseases.[12,14] This risk is directly proportional to the length of time smoked, the number of cigarettes smoked per day, the depth of smoke inhalation and the nicotine and tar content of the brand.[4,5]

In the results of the dependence test questions, there were coincidences in terms of smoking in the first five minutes after waking up,[5] but there were differences in the other parameters it evaluates; for example, the respondents stated that it was difficult for them not to smoke in places where it is forbidden. Contrary to this study, in which they indicated that they found it essential to have another cigarette more than the first one in the morning and that consumption was lower, 10 or fewer cigarettes per day and more frequent during the first hours of the day; in addition, they stated that they smoked even when they were ill.[5]

In general, studies that evaluate tobacco consumption measure the number of cigarettes per day, although the design differs from that of this research; in several reviewed works the figure reported is lower than that observed in these consumers, among whom a high number smoke more than 20 cigarettes per day.[4,5,6] Similarities were found with a study conducted in a smoking unit that evaluated gender differences in success in quitting smoking[16] and in another conducted in female smokers in Chile.[17]

It has been suggested that the level of dependence, both psychological and physical, is greater when cigarette consumption increases.[1,2] In this study it was observed that, despite the high number of cigarettes consumed per day, the degree of low dependence was higher than medium and high dependence separately; nevertheless, the fact that medium-high dependence was found in more than half of the consumers stands out. Smokers with a higher degree of nicotine dependence experience greater difficulties in quitting smoking. The relationship between the degree of dependence and morbidity and mortality due to chronic noncommunicable diseases[13,18,19] is an indicator to be taken

into account in smoking cessation, in the promotion of healthy lifestyles and in the prevention of tobacco use and other toxic habits.

Despite the differences in consumption patterns observed in the study group, no association was found between the degree of dependence and the variables in which this indicator was analyzed, which may be related to the small size of the sample and to biases related to the application of the instrument. When a person is questioned on a certain topic, biases may be introduced in the research because the subject responds based on what is considered "socially acceptable" and not on reality, regardless of whether measures have been taken to avoid them in the construction and application of the instruments,[19] the non-coincidence with what is reported in the literature could be related to the above.

Regarding the relationship between sex and degree of dependence, different behavior was observed between men and women; in the case of the male sex there was a clear predominance of the low degree of dependence. In the female sex, the values of the different degrees of dependency were similar, and it was noteworthy that more than half of the women had medium-high dependency, which differs from what has been observed in other studies.[16,17,18]

Despite the lack of association, from a statistical point of view, between the degree of dependence, age of initiation and time of consumption observed in this study, it should be noted that half of the consumers who had been smoking for more than 40 years showed high dependence and most of those who started smoking before the age of 20 years showed medium-high dependence. The influence of starting smoking at an early age and maintaining it is recognized as one of the factors that contribute to sustaining the habit and to greater health risks.[10]

Smoking is considered the risk factor that has the greatest impact on the main causes of morbidity and mortality due to chronic noncommunicable diseases, a risk that increases when high levels of consumption, other toxic habits and personal pathological antecedents coexist.[20] The behavior observed in the study group provides a frame of reference for further research to broaden the characterization of smokers and facilitate the design of effective smoking cessation, health promotion and prevention programs.

CONCLUSIONS

The consumption pattern found, the association with other toxic habits, chronic diseases and the predominance of medium-high dependence predispose these smokers to a decrease in life expectancy and to face greater difficulties in quitting smoking in the event of being subjected to a smoking cessation strategy.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHORS' CONTRIBUTION

MCMT: conceptualization, formal analysis, research, methodology, project management, writing the original draft, writing (review and editing).
AAH: formal analysis, research, methodology, writing the original draft, writing (review and edit).
NPC: data curation, methodology, writing the original draft, writing (reviewing and editing).

IDM, MMP: formal analysis, research, writing the original draft, writing (reviewing and editing).
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