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Original Article

Nicotine dependence degree of patients treated for smoking addiction at a public university

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Objective: to identify the nicotine dependence degree and sociodemographic data according to the gender of the patients assisted by the Educating and Treating Smoking extension project promoted by a public university. **Method:** a cross-sectional study, with data from 361 medical records of patients participating in the project from 2014 to 2018. The Fagerström test was performed, through which patients with a degree of dependence were classified as follows: very low, low, medium, high, and very high, according to the sum of the points obtained in the applied questions. **Results:** predominance in the nicotine dependence degree was observed in women with higher percentages of classification for high and very high dependence, 33.5% and 25.3% respectively. Among men, a high degree of dependence was found to be 28.1% and low, 21.9%. It was found that the degree of chemical dependence on nicotine was associated with physical (p-value = 0.002) and psychological (p-value = 0.003) dependence. **Conclusion:** the evidence for a higher frequency of individuals with a high chemical dependence degree for nicotine demonstrates the importance of combining drug therapies with cognitive behavioral approaches through Nursing interventions, related to controlling and quitting the smoking addiction through health education.

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Descriptors: Chemical Dependency; Smoking; Nicotine; Tobacco use Disorder.

Grau de dependência à nicotina de pacientes atendidos para tratamento do tabagismo em universidade pública

Objetivo: identificar o grau de dependência à nicotina e dados sociodemográficos segundo o gênero dos pacientes atendidos pelo projeto de extensão Educando e Tratando o Tabagismo promovido por uma universidade pública. **Método:** estudo transversal, com dados provenientes de 361 prontuários de pacientes que participantes do projeto no período de 2014 a 2018. Realizou-se o teste de Fagerström, por meio do qual classificou-se os pacientes com grau de dependência: muito baixo, baixo, médio, elevado e muito elevado de acordo com a soma dos pontos obtidos nas questões aplicadas. **Resultados:** a predominância no grau de dependência a nicotina foi observada no sexo feminino com maiores percentuais de classificação para dependência elevada e muito elevada, 33,5% e 25,3% respectivamente. Entre os homens verificou-se grau de dependência elevado 28,1% e baixo 21,9%. Contatou-se que o grau de dependência química a nicotina esteve associada a dependência física (valor-p=0,002) e psicológica (valor-p=0,003). **Conclusão:** a evidência de maior frequência de indivíduos com alto grau de dependência química à nicotina demonstra a importância da associação de terapias medicamentosas com abordagens cognitivas comportamentais por meio de intervenções de enfermagem, relacionadas ao controle e cessação do tabagismo por meio da educação em saúde.

Descritores: Dependência Química; Fumar; Nicotina; Tabagismo.

Grado de dependencia a la nicotina de pacientes tratados por fumar en una universidad pública

Objetivo: identificar el grado de dependencia a la nicotina y los datos sociodemográficos según el género de los pacientes atendidos por el proyecto de extensión Educar y tratar el tabaquismo promovido por una universidad pública. **Método:** estudio transversal, con datos de 361 registros médicos de pacientes que participaron en el proyecto de 2014 a 2018. Se realizó la prueba de Fagerström, a través de la cual se clasificaron los pacientes con un grado de dependencia: muy bajo, bajo, medio, alto y muy alto de acuerdo con la suma de los puntos obtenidos en las preguntas aplicadas. **Resultados:** el predominio en el grado de dependencia a la nicotina se observó en mujeres con porcentajes más altos de clasificación de dependencia alta y muy alta, 33.5% y 25.3% respectivamente. Entre los hombres, se encontró un alto grado de dependencia del 28,1% y bajo del 21,9%. Se encontró que el grado de dependencia química de la nicotina se asoció con el físico (valor p = 0.002) y psicológico (valor p = 0.003). **Conclusión:** la evidencia de una mayor frecuencia de individuos con un alto grado de dependencia química de la nicotina demuestra la importancia de combinar las terapias farmacológicas con enfoques cognitivos conductuales a través de intervenciones de enfermería, relacionadas con el control del tabaquismo y la cesación a través de la educación sanitaria.

Descritores: Dependencia Química; Fumar; Nicotina; Tabaquismo.

Introduction

The smoking addiction is considered one of the main causes of preventable deaths in the world and contributes negatively to the growing problem in public health, as it shows a high risk of developing cancer, respiratory, and cardiovascular problems, among others[1].

The tobacco action causes millions of deaths and, if no measure is taken, this figure tends to increase since the number of smokers has increased more and more, especially in developing countries[2].

The main substance responsible for smoking addiction dependence is nicotine. According to studies, approximately 90% of the daily smokers are dependent on it, since nearly 25% of the inhaled nicotine crosses the pulmonary alveolus and reaches the brain via blood in 15 seconds, a fact that corroborates for the high rate of dependence to be caused quickly[3-4].

There are two types of chemical dependence: physical, where abstinence symptoms occur, such as sweating and tremors; and psychological, where the smokers seek in smoking an escape valve for day-to-day problems, using cigarettes as a way to calm down and relieve stress[5].

The world-renowned Fagerström test is used to assess nicotine dependence. It is through this that the degree of nicotine-related dependence is established, being classified according to the obtained result into very low, low, medium, high, and very high[4].

A number of studies show that the nicotine dependence degree will directly influence the greater or lesser difficulty of the individual to abandon the addiction, which can significantly compromise health[6].

Thus, evaluating the degree of nicotine-related dependence is of paramount importance, since it is from this substance that the individuals become dependent on tobacco, which leads them to have serious problems both related to health and biopsychosocial aspects, contributing to a deficit in quality of life.

In this context, the problem is stated as follows: How does the nicotine dependence degree affect quitting the smoking addiction in patients undergoing treatment?

In this study, the objective is to identify the nicotine dependence degree and the sociodemographic data according to the gender of the patients assisted by the Educating and Treating Smoking extension project at the State University of Ponta Grossa (*Universidade Estadual de Ponta Grossa*, UEPG) in Paraná (PR).

Method

This is a cross-sectional and epidemiological study, with data obtained from the records of the patients who took part in the period from 2014 to 2018 in the Extension Project entitled "Educating and Treating Smoking", at the State University of Ponta Grossa, PR. The project aims to treat the smoking addiction and follows the rules established by the National Cancer Institute (*Instituto Nacional de* Câncer, INCA) and by the Ministry of Health.

The project's development at the University occurs through four weekly meetings and three fortnightly maintenance meetings; in a first instance, the cognitive behavioral approach is performed, in group. This assistance is performed by Nursing, Physical Education, Pharmacy, and Medicine undergraduate students and teachers. In a second instance, the patients are treated individually by a nursing, physical education and medical consultation, which establishes drug treatment, when necessary, with the objective of assisting in treating the smoking addiction. Such medications are distributed free of charge, because they are part of the ministerial program, made available in the school pharmacy of the State University of Ponta Grossa.

The variables of interest are represented by the nicotine dependence degree, obtained through the Fagerström test, which classifies the dependence of individuals as very low (0 to 2), low (3 to 4), medium (5), high (6 to 7), and very high (8 to 10), according to the score obtained at the end of the test. For the sociodemographic variables, the following were listed: age, gender, schooling, marital status, type of dependence, motivation degree and selected method to quit the smoking addiction, type of medications used, if previously treated or took part in some smoking addiction treatment group, the number of cigarettes smoked *per* day, and also the smoking addiction time. Finally, the percentage for quitting the smoking addiction, which is obtained at the last meeting after medical evaluation.

Data was collected at the University, along with the patients' medical records, in November and December 2018. Initially, data was entered into an Excel spreadsheet; subsequently, the descriptive analyses with simple and relative frequency estimates of the variables of interest according to the classification in low/very low, moderate, and high/very high dependency level were conducted. To verify the differences between the proportions of the qualitative variables according to these classifications, the chi-square test was applied. For better visualization of the qualitative analyses, bar graphs were produced with the relative frequencies.

For the quantitative variables of age, number of cigarettes/day, and years of smoking addiction, the Shapiro-Wilk test was performed for adherence to the normal distribution and, since there was no symmetry in their distribution (p-values > 0.05), it was decided to use the non-parametric data approach. Then, the

Kruskall-Wallis test was used, followed by Dunn's as a post-hoc test to verify the differences in the dependence levels. For better visualizing the quantitative analyses, boxplot graphs were produced. All the tests were considered significant when p-value < 0.05, and the analyses were performed on the IBM SPSS Statistics 20.0 software.

The research was approved by the Research Ethics Committee of the State University of Ponta Grossa in 2018 under number 2,991,057.

Results

Between 2014 and 2018, a total of 361 individuals participated in the Educating and Treating Smoking extension project of the State University of Ponta Grossa, and it was observed that the demand for the project was predominantly by women, corresponding to 64.5% of the participants.

Table 1 describes the patients' schooling and mean age. Complete high school and complete or incomplete higher education were predominant among the men, with 35.2% and 27.3% respectively. For the women, a higher frequency of incomplete elementary school (30.5) and of complete high school (37.8%) is observed. The men had a mean age of 45.8 years old (Standard Deviation = 14.1) and, among women, the mean was 49.5 years old (Standard Deviation = 11.8).

Table 1 - Schooling and mean age of the participants of the Educating and Treating Smoking Extension Project promoted in the period from 2014 to 2018 by the State University of Ponta Grossa. Ponta Grossa, PR, Brazil, 2018

Variables	Men		Women	
	Total	%	Total	%
1 - Schooling level				
Incomplete elementary school	31	24.2%	71	30.5%
Complete elementary school	11	8.6%	27	11.6%
Incomplete high school	06	4.7%	11	4.7%
Complete high school	45	35.2%	88	37.8%
Incomplete/Complete higher education	35	27.3%	36	15.4%
TOTAL	128	100%	233	100%
	Mean	Standard deviation	Mean	Standard deviation
2 - Age	45.8	14.1	45.9	11.8

Table 2 refers to the characteristics of the smokers who participated in the Educating and Treating Smoking Extension Project. Regarding the type of nicotine dependence, the physical was more frequent for both men and women, with 49.2% and 55.4% respectively.

Table 2 - Characteristics of the smokers participating in the Educating and Treating Smoking Extension Project promoted in the period from 2014 to 2018 by the State University of Ponta Grossa. Ponta Grossa, PR, Brazil, 2018

Variables	Men		Women	
	Total	%	Total	%
1 - Type of dependence				
Not informed	54	42.2%	106	45.5%
Physical dependence	63	49.2%	129	55.4%
Behavior association	59	46.1%	86	36.9%
Psychological dependence	39	30.5%	74	31.8%
2 - Degree of motivation for quitting the smoking addiction				
Not informed	63	49.2%	121	51.9%
Precontemplation: Does not think about quitting the smoking addiction	0	0%	02	0.9%
Contemplation: Thinks about quitting the smoking addiction someday	09	7.0%	17	7.2%
Preparation: Thinks about setting a date to quit the smoking addiction	12	9.4%	21	9.0%
Ready to act: Wants to quit the smoking addiction in the first month	35	27.4%	58	24.9%
Maintenance: Quit the smoking addiction	0	0%	02	0.9%
Recurrence: Quit the smoking addiction, but relapsed	09	7.0%	12	5.2%
3 - Method chosen to quit the smoking addiction				
Not informed	33	25.8%	61	26.2%
Abrupt quitting	39	30.5%	60	25.8%
Gradual quitting	49	38.3%	97	41.6%
Reduction only	04	3.1%	13	5.6%
Postponement	03	2.3%	02	0.8%
4 - Medications used to quit the smoking addiction				
Did not use any medication	21	16.4%	20	8.6%
Nicotine patch	104	81.3%	210	90.1%
Bupropion	25	19.5%	41	17.6%
Combination therapy	21	16.4%	38	16.3%
5 - Project abandonment, reduction and cessation of cigarette use				
Abandonment	38	29.7%	66	28.3%
Reduction	44	34.4%	86	36.9%
Cessation	46	35.9%	81	34.8%
6 - Have you undergone any treatment to quit the smoking addiction				
Yes	31	24.2%	76	32.6%
No	97	75.8%	156	67.4%

Variables	Men		Women	
	Total	%	Total	%
7 – Have you been part of a support group dealing with the smoking addiction				
Yes	11	8.6%	40	17.2%
No	117	91.4%	193	82.8%
TOTAL	128	-	233	-
	Mean	Standard deviation	Mean	Standard deviation
8 - Cigarettes smoked *per* day	24.2	9.2	23.0	9.0
9 – Smoking time in years	27.7	14.5	31.4	13.1

A higher prevalence of being ready to quit the smoking addiction in the first four weeks was observed in both genders, with 27.4% for men and 24.9% for women. It is noticed that the method chosen for quitting the smoking addiction that stood out was gradual quitting, with 38.3% for men and 41.6% for women. It was verified that both men and women used the nicotine patch for quitting the smoking addiction as drug therapy, with 81.3% and 90.1% respectively.

It was found that 35.9% of the men and 32.8% of the women quit the smoking addiction. Regarding the reduction in the number of cigarettes smoked *per* day, nearly 24.4% of the men were able to reduce it. Among the women, there was a higher rate of reduction, around 36.9%. Regarding the rate of treatment abandonment, it was 29.7% in men and 28.3% in women.

Approximately 75.8% of the men and 67.4% of the women stated that they had never undergone any type of treatment for the smoking addiction. And also among men and women, the vast majority, 91.4% and 82.8% respectively, stated that they had never participated in a support group for treating the smoking addiction.

It is also noteworthy that the mean number of cigarettes smoked by men was nearly 24.2 cigarettes *per* day (Standard Deviation = 9.2). Among the women, a mean consumption of 23.0 cigarettes *per* day was observed (Standard Deviation = 9.0). As for the smoking time of the patients, men had a mean of 27.7 years (Standard Deviation = 14.5), and the mean value in women was 31.4 years (Standard Deviation = 13.1).

The result of the Fagerström test is shown in Table 3. Among the women, a higher prevalence was observed of the high degree (33.5%) and of the very high degree (25.3%). Among the men, there was greater predominance of the high and low degrees, with 28.1% and 21.9% respectively.

Table 3 - Fagerström test applied to the participants in the Educating and Treating Smoking Extension Project promoted from 2014 to 2018 by the State University of Ponta Grossa. Ponta Grossa, PR, Brazil, 2018

Degree of dependence	Women		Men	
	Total	%	Total	%
Very low	18	7.7%	12	9.4%
Low	43	18.5%	25	21.9%
Medium	35	15.0%	26	20.3%
High	78	33.5%	36	28.1%
Very high	59	25.3%	26	20.3%
TOTAL	233	100%	128	100%

The association between nicotine dependence degree, sociodemographic variables, and characteristics of the smokers is shown in Table 4. It is verified that a high degree of dependence on nicotine was associated with physical (p-value = 0.002) and psychological (p-value = 0.003) dependence.

Table 4 - Association between sociodemographic variables, the smokers' characteristics, and the nicotine dependence degree. Ponta Grossa, PR, Brazil, 2018

Variables	Degree of chemical dependence						Total		p-value
	Low and very low		High and very high		Medium				
	n	%	n	%	n	%	n	%	
Gender									
Male	31	29.5%	50	47.6%	24	22.9%	105	100%	0.998
Female	46	23.8%	19	61.7%	28	14.5%	90	100%	
Marital status									
Widow/Widower	6	23.1%	18	69.2%	2	7.7%	26	100%	
Single	23	32.9%	35	50.0%	12	17.1%	70	100%	
Divorced	5	17.2%	21	72.4%	3	10.3%	29	100%	0.233
Married/Stable union	36	24.0%	81	54.0%	33	22.0%	150	100%	
Not informed	7	30.4%	14	60.9%	2	8.7%	23	100%	

(to be continued...)

(Table 4 – continuation)

Variables	Degree of chemical dependence						Total		p-value
	Low and very low		High and very high		Medium				
	n	%	n	%	n	%	n	%	
Schooling									
Illiterate	0	0.0%	1	100%	0	0.0%	1	100%	
Elementary school	29	27.4%	58	54.7%	19	17.9%	106	100%	
High school	28	26.7%	60	57.1%	17	16.2%	105	100%	0.728
Higher education	14	23.7%	31	52.5%	14	23.7%	59	100%	
Not informed	6	22.2%	19	70.4%	2	7.4%	27	100%	
Physical dependence									
Yes	24	17.8%	91	67.4%	20	14.8%	135	100%	0.002
No	53	32.5%	78	47.9%	32	19.6%	163	100%	
Behavioral associations									
Yes	29	24.4%	70	58.8%	20	16.8%	119	100%	0.832
No	48	26.8%	99	55.3%	32	17.9%	179	100%	
Psychological dependence									
Yes	15	16.3%	68	73.9%	9	9.8%	92	100%	0.003
No	62	30.1%	101	49.0%	43	20.9%	206	100%	
Abrupt quitting									
Yes	20	27.0%	42	56.8%	12	16.2%	74	100%	0.933
No	57	25.4%	127	56.7%	40	17.9%	224	100%	
Gradual quitting									
Yes	23	20.4%	67	59.3%	23	20.4%	113	100%	0.201
No	54	29.2%	102	55.1%	29	15.7%	185	100%	
Reduction only									
Yes	4	16.7%	15	62.5%	5	20.8%	24	100%	0.556
No	73	26.6%	154	56.2%	47	17.2%	274	100%	
Postponement									
Yes	1	14.3%	6	85.7%	0	0.0%	7	100%	0.261
No	76	26.1%	163	56.0%	52	17.9%	291	100%	
Medication: Patch									
No	12	30.0%	21	52.5%	7	17.5%	40	100%	0.806
Yes	65	25.4%	147	57.4%	44	17.2%	256	100%	
Medication: Bupropion									
No	70	27.2%	143	55.6%	44	17.1%	257	100%	0.458
Yes	7	17.9%	25	64.1%	7	17.9%	39	100%	

The association between the nicotine dependence degree, sociodemographic variables, and characteristics of the smoking addiction is described in Table 5. It is verified that the higher the median of cigarettes smoked *per* day, the greater the degree of dependence on nicotine (p-value = 0.003).

Table 5 - Association between the nicotine dependence degree, age, cigarettes smoked *per* day, and years of the smoking addiction among the participants in the Educating and Treating Smoking Extension Project promoted from 2014 to 2018 by the State University of Ponta Grossa. Ponta Grossa, PR, Brazil, 2018

Degree of dependence	Statistics	Age	Cigarettes/day	Years of the smoking addiction
Low and very low	Mean	47	17	29
	Standard deviation	14	5	15
	Median	49	20	30
	Interquartile range	8-56	10-20	20-40
High and very high	Mean	47	28	30
	Standard deviation	12	9	13
	Median	49	30	30
	Interquartile range	37-57	20-40	20-40
Medium	Mean	50	21	30
	Standard deviation	13	7	14
	Median	52	20	21
	Interquartile range	44-27	20-20	21-20

Discussion

Men are the major tobacco users around the world[7]. However, in this research there was a predominance of women smokers looking for treatment; however, it should be noted that, historically, men seek treatment or support only when the symptoms of illness are more evident, a fact that may have contributed to the low demand of the male audience to quit smoking[8].

In contrast to similar studies, mainly smokers with low schooling were found, with incomplete elementary and high school education prevailing[9-11]. This is one of the factors that can influence the success or not for quitting the smoking addiction, since individuals with lower schooling have greater difficulty in quitting the addiction due to the low level of education that they have acquired over the years[4,7,9,12-13].

With regard to the mean age of the smokers, the result was equivalent to previous studies, which report it is around 45 years old for both men and women[11-12,14]. There is evidence in a number of research studies that the age for smoking addiction initiation is increasingly precocious, around 15 years old, approximately[10,15]. It is known that early age influences the mean smoking addiction time of the smokers, which, according to studies,

is around 30 years, which manifests a reflection of this research and also presents greater risks because the chances for developing smoking-associated diseases increase significantly[16-17]. However, a recent research study has pointed out the decrease in the prevalence of the smoking addiction among young Brazilians, a fact that is extremely important for a better quality of life of the individuals[18].

There is a deficit of studies in the area related to the type of dependence, be it physical or psychological. Individuals who were physically dependent on nicotine emerged more frequently in this study, which can be considered a warning sign, as the chances of withdrawal signs developing are greater due to the high degree of nicotine-related dependence. While the smokers considered psychologically dependent on nicotine seek smoking addiction as an outlet for stress and everyday problems, this can become routine so that they do not realize that they are becoming increasingly dependent[5].

As evidenced by an analogous study, the "Ready to act" motivational phase was predominant, and this demonstrates the willingness to wishing to quit the smoking addiction in the first four weeks after starting the treatment, which is very significant in order to achieve the main objective of eliminating the addiction to nicotine; on the other hand, the type of acceptance on the part of the health professionals for this fact is very important, because the more they show support, the greater the motivation to not abandoning the treatment will be[19].

In an equal manner to other studies, the abrupt mode, which is the one in which the smoker suddenly quits the smoking addiction, and gradual quitting, where the smoker gradually decreases the number of cigarettes/day, are generally the most chosen to quit the smoking addiction[20-21].

Pharmacotherapy is used to control nicotine-related abstinence, with nicotine patches and bupropion being mostly used[22]. The national literature has shown that, between such medications, nicotine patches are widely used for treating the smoking addiction[23].

Due to the fact that the degree of chemical dependence on nicotine is often very high, people give up the treatment for quitting the smoking addiction and, for those individuals who were unable to quit smoking for the first time, participation and brief knowledge about the treatment is already relevant, showing that the health professionals play a very important role in increasingly engaging and supporting people who want to quit the smoking addiction[15].

Several conjectures indicate that smokers, especially those with a high nicotine dependence degree, have never been treated to quit the smoking addiction because, due to their high addiction, the desire to

try to quit smoking is almost non-existent, which can compromise the success of treatment if not addressed properly[24-25].

The burden of smoking is something that is strictly linked to high dependence on nicotine and also to the economic aspects, since the high cost of purchasing cigarettes daily could be reversed to meet other essential needs[26]. In this study, the mean number of cigarettes smoked *per* day was between 22 and 24, a fact that corroborates with national surveys that show the same results in the course of the statistical analyses[26-28].

There are countless research studies in the literature about the large number of smokers who are considered as with high and very high nicotine dependence according to the Fagerström test, needing in addition to a high motivation degree, a cognitive, behavioral, and also medication approach to quit the smoking addiction[6,14,16,27,29].

This study allowed knowing the sociodemographic and addiction profile of the individuals assisted by the Educating and Treating Smoking program, and can subsidize actions to improve the approach and future interventions that directly impact on quitting the smoking addiction.

The limitations found were related to the failure to fill in some information, thus pointing out to the need for calibrating the project's executing team.

Another factor to be mentioned is that the number of smokers who have permanently quit the smoking addiction can be greater than that presented because they may have been able to cease after the end of treatment in the Project, although this information was not collected.

Conclusion

The study made it possible to identify the nicotine dependence degree and the sociodemographic data according to the gender of the patients assisted by the Educating and Treating Smoking extension project at the State University of Ponta Grossa-PR.

Most of the smokers are characterized by the high rate of cigarettes smoked *per* day in conjunction with both physical and psychological dependence, a fact that, often associated with low schooling, contributes negatively for the degree of nicotine-related dependence being extremely high.

Regardless of gender, there was a higher frequency of high nicotine dependence degree in the patients, which demonstrates the importance of combining drug therapies with cognitive behavioral approaches through Nursing interventions, related to controlling and quitting the smoking addiction through health-related education.

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