ORIGINAL ARTICLE

Young male daily smokers are nicotine dependent and experience several unsuccessful quit attempts

TUULA TOLJAMO¹, ANNA HAMARI², PENTTI NIEMINEN² & VUOKKO L. KINNULA³

¹Department of Pulmonary Medicine, Lapland Central Hospital, Rovaniemi, Finland, ²Medical Informatics and Statistics Research Group, University of Oulu, Oulu, Finland, and ³Department of Medicine, Pulmonary Division, University of Helsinki, Institute of Clinical Medicine, Department of Medicine and Helsinki University Central Hospital, Helsinki, Finland

Abstract

Objective. Previous studies on smoking cessation have generally been conducted with adolescents or adults. Very little is known about the cessation attempts, their success, and/or use of pharmacological aids in young adult smokers who want to quit. The present study aimed to investigate quitting attempts in a group of both young male daily and occasional smokers. **Design and subjects.** 614 male smokers aged 18–26 years completed a standardized questionnaire about their smoking habits, quit attempts, and aids used in smoking cessation. **Results.** Nearly all daily smokers (95.3%, 95% CI 93.1–96.8) were nicotine addicted to some extent according to the standardized questionnaire, and the more addicted they were, the more often they had tried to quit ($p = 0.025$). Of the daily smokers, 55.6% (95% CI 51.3–59.9) had made quit attempts and 36.2% (95% CI 32.1–40.4) had used nicotine replacement therapy (NRT). In all, 34.1% (95% CI 25.2–44.3) of all occasional smokers reported having intended to quit but they had seldom made more than one attempt whereas 20.2% of daily smokers had made at least three attempts. The stronger the nicotine dependence in daily smokers was, the more likely the subject was to have attempted to use NRT (quite dependent 23.8% vs. totally dependent 48.9%) ($p < 0.001$). **Conclusions.** A high proportion of young male daily smokers were nicotine addicted. Young smokers make many unsuccessful attempts to stop smoking using nicotine replacement therapy (NRT) on their own. A better availability of professional cessation services directed to young adult smokers is needed.

Key Words: Finland, general practice, male smoking cessation, nicotine dependence, pharmacological aid, quit attempt, young adults

Introduction

The global smoking prevalence among young adults/adolescents varies from 10% to 40% [1]. Approximately 18–32% of Finnish young adults smoke daily; occasional female smokers are more common than male (8% vs. 6%) [2]; the number of daily young male smokers in Northern Finland is over 40% [3]. Self-reported estimates of smoking may underestimate true smoking prevalence, but based on recent studies these numbers are relatively reliable [4–6].

Even occasional tobacco use by adolescents can trigger early symptoms of dependence [7]. The key issue is to prevent starting of smoking, but if smoking has been initiated young smokers are often considered not to be nicotine addicted, i.e. they can quit if they want. It is also believed that the same cessation interventions as for adults can be adapted to adolescents [8,9].

Most young smokers want to quit but the discomfort experienced during cessation attempts is likely to be negatively associated with cessation success [10,11]. Adult daily smokers have generally smoked daily at the age of 18 [12,13] confirming that stopping of smoking at a young age is difficult. Moreover, the number of light and occasional young smokers is increasing [14].

There are several predictors of using pharmacological treatment such as female gender and heavy nicotine dependence [8,15,16], but the success rates have been lower in adolescents than in adults [8]. In a systematic review on cessation interventions for young people [17] only two evaluated pharmacological aids for quitting. Overall, very little progress has been achieved in the smoking cessation programming aimed at young smokers [8,17–19]. Very few if

- Nearly all young male daily smokers concede that they suffer from nicotine addiction, whereas most occasional smokers consider the question of nicotine addiction irrelevant.
- Both daily and occasional young male smokers make unsuccessful attempts to stop smoking without nicotine replacement therapy (NRT) and/or use NRT on their own without supervision.
- Young male quitters seem to be unfamiliar with free national web-based counselling services or they lack plans for quitting beforehand.

any studies have compared daily and occasional young smokers. The aims in our study were to examine factors associated with smoking cessation of young male military conscripts. The research questions were as follows:

- (1) How heavily nicotine dependent are young adult smokers?
- (2) How many attempts have they made to try to quit smoking?
- (3) Which factors are associated with increased use of pharmacological cessation aids?
- (4) Which specific features are associated with daily vs. occasional young smokers?

Material and methods

The study subjects included 614 military recruits starting their military service in the Light Infantry Brigade and Lapland Anti-aircraft Regiment, part of the Northern Command of the Finnish Defence Forces, during autumn 2008 to spring 2009. The participants felt themselves to be healthy, although they were daily and occasional smokers as described in detail previously [3]. Military service is compulsory for all Finnish men. A new batch of conscripts enters yearly in January and in July. Women have been able to perform military service voluntarily since 1994. The Finnish Defence Forces share common health care services including the policy of smoking prevention and cessation treatment. Only 12 women (1%) conscripts answered the questionnaire, but they were excluded due to their low number and 17 participants were excluded because they gave contradictory answers. This standardized questionnaire assessed demographic and background characteristics, detailed smoking history associated with self-assessment of whether they considered themselves to be nicotine-dependent, self-reported number of quit attempts, use of pharmacological aids in smoking cessation, and exposure to environmental tobacco smoke. Nicotine

dependence for daily smokers was calculated according to the Heaviness of Smoking Index (HSI) [20], since indicators of dependence designed for adults are known to be usable for daily smoking adolescents [21]. Questions were based on the biannual large-scale nationwide postal Adolescent Health and Lifestyle Survey in 1977–2009 [3,22].

The data were analysed using SPSS for Windows 18.0 software. Cross-tabulation was employed to compare smoking cessation and the distribution of the use of pharmacological aids according to age, education, age at smoking initiation, nicotine dependence, and self-reported nicotine addiction. To evaluate the statistical significance between groups, a chi-squared test or Fisher's exact test was used for the categorical variables. An independent samples t-test was used to compare the distributions of the continuous variables between two groups.

Results

Most daily but not occasional smokers were nicotine dependent

In all, 85.2% ($n=523$) were daily smokers and 14.8% ($n=91$) were occasional smokers. The mean age of daily smokers was 19.5 years (SD 0.87), they had started to smoke at the mean age of 14.7 years (SD 2.1), and had smoked for 4.8 years (SD 2.2). The mean age of occasional smokers was 19.4 years (SD 0.64) and they had started smoking later than daily smokers, at the mean age of 15.9 years (SD 2.2) ($p<0.001$), and they had smoked less, i.e. for 3.4 years (SD 2.3) ($p<0.001$).

Table I presents the distribution of smoking cessation attempts in daily smokers according to nicotine dependence variables. Even 30% of daily smokers had smoked for six or more pack years. Nearly all daily smokers (95.3%, 95% CI 93.1–96.8) were nicotine addicted to some extent, and the more addicted they were, the more often they had tried to quit ($p=0.025$). According to HSI, 71.4% (95% CI 67.3–75.2) were moderately or heavily nicotine dependent. Overall, 57.7–63% in every HSI subgroup had tried to quit. Furthermore, if a daily smoker had ever made an attempt to quit, this was not significantly associated with the time of smoking the first cigarette in the morning ($p=0.915$) or history of pack years ($p=0.147$).

The nicotine addiction of daily smokers differed in many aspects from that of occasional smokers: over half of the occasional smokers (56.0%, 95% CI 45.8–65.8) who did answer were nicotine addicted at least to some extent (Table II). Occasional smokers smoked the first cigarette in the morning much later than most of the daily smokers.

Table I. Distribution of smoking cessation attempts by nicotine dependence variables in 523 young adult daily smokers.

Variable	Have you ever tried to quit smoking?		All n (%)	p-value of chi-squared test
	Yes n (%)	No n (%)		
HSI*				0.572
• 0–1	82 (57.7)	60 (42.3)	142 (100)	
• 2–4	192 (63.0)	113 (37.0)	305 (100)	
• 5–6	31 (62.0)	19 (38.0)	50 (100)	
First cigarette in the morning (min)				0.915
• ≤ 5	25 (59.5)	17 (40.5)	42 (100)	
• 6–30	122 (61.3)	77 (38.7)	199 (100)	
• 31–60	117 (62.2)	71 (37.8)	188 (100)	
• > 60	48 (57.8)	35 (42.2)	83 (100)	
Pack-years				0.147
• < 3	108 (60.0)	72 (40.0)	180 (100)	
• 3–5.99	94 (57.7)	69 (42.3)	163 (100)	
• ≥ 6	100 (68.0)	47 (32.0)	147 (100)	
Self-assessment of nicotine addiction				0.022
• No, totally disagree	10 (40.0)	15 (60.0)	25 (100)	
• Yes, quite agree	68 (54.4)	57 (45.6)	125 (100)	
• Yes, I'm addicted	108 (62.8)	64 (37.2)	172 (100)	
• Totally agree	122 (65.6)	64 (34.4)	186 (100)	
• I don't know	3 (60.2)	6 (66.7)	9 (100)	

Notes: *HSI = Heaviness of Smoking Index. Total number of subjects varies due to missing values.

Most daily smokers had made several quit attempts

In all, 14.1% of all occasional smokers reported having tried to quit vs. 55.4% of daily smokers. 20.2% of all daily smokers had made at least three quit attempts, whereas most occasional smokers had made one unsuccessful attempt (see Table II).

Use of pharmacological aids was associated with nicotine dependence

The descriptive analysis of using any pharmacological aid is shown in Table II. Most daily smokers (52.8%) had not used any pharmacological aids in their quitting attempts, but if used they mainly chose nicotine chewing gum (34%). Only two subjects had used bupropion or varenicline (data not shown). Study subjects did not admit to having used community pharmacists' advice or any support. The more the daily smoker had made quit attempts, the more likely he had used NRT ($p = 0.025$). On the other hand, 40% of those who had historically made at least five quit attempts had not used any pharmacological aids. Most occasional smokers tried to quit without NRT (80%), no matter how many quit attempts they had made.

Neither education nor age of young adults was significantly associated with the use of NRT in quitting. Half of the daily smokers who smoked soon after waking up had used NRT, but only 24.1% of those who smoked the first cigarette later had taken

any medication ($p = 0.026$). The more the daily smokers had smoked in pack years, the more they resorted to medication in their quitting attempts (46.5% with six or more pack years vs. 27.4% with less than three pack years) ($p = 0.002$). Most of those daily smokers who were nicotine addicted had not used NRT (62.3%). Only 25% of all occasional smokers were nicotine addicted, and only a few of them had tried NRT ($n = 12$, 24%). In most cases, the daily smoker's father and/or mother smoked or had quit smoking, 66% and 52.6% respectively, but parental smoking was not significantly associated with the use of NRT (data not shown). As many as 38% of daily smokers smoked freely at home, but none the less the use of NRT was not associated with smoking at home ($p = 0.062$). The stronger the nicotine dependence, the more likely the subject was to have attempted to use NRT (quite dependent 23.8% vs. totally dependent 48.9%) ($p < 0.001$).

Discussion

This study shows that the young adult daily male smokers are more likely to be nicotine dependent than occasional smokers. In addition, daily smokers with more serious nicotine dependence have more often experienced unsuccessful quit attempts without the benefit of NRT, which in turn may be related either to lack of quitting plans or to the poor availability of professional cessation services for this age group.

Table II. Distribution of using pharmacological aids in daily (n = 523) and occasional (n = 91) young adult smokers according to age, education, and variables of nicotine addiction.

	Daily smoker				Occasional smoker			
	Yes n (%)	No n (%)	Total n (%)	p-value	Yes n (%)	No n (%)	Total n (%)	p-value
Age:								
18–19	114 (36.1)	202 (63.9)	316 (100)	0.491 ¹	12 (20.3)	47 (79.7)	59 (100)	0.05 ²
20	57 (34.5)	108 (65.5)	165 (100)		6 (20.0)	24 (80.0)	30 (100)	
21–26	15 (45.5)	18 (54.5)	33 (100)		0	2 (100)	2 (100)	
Education:				0.627 ¹				0.526
Primary school only	32 (41.0)	46 (59.0)	78 (100)		1 (12.5)	7 (87.5)	8 (100)	
Vocational school	114 (35.3)	209 (64.7)	323 (100)		10 (25.9)	30 (75.0)	40 (100)	
Upper secondary school	40 (35.4)	73 (64.6)	113 (100)		7 (16.3)	36 (83.7)	43 (100)	
HIS:*				0.085 ¹				
0–1	41 (29.1)	100 (70.9)	141 (100)					
2–4	121 (39.9)	182 (60.1)	303 (100)					
5–6	19 (38.0)	31 (62.0)	50 (100)					
First cigarette in the morning:				0.026 ¹				0.188 ²
≤ 5 min	21 (50.0)	21 (50.0)	42 (100)		0	0	0	
6–30	77 (38.9)	121 (61.1)	198 (100)		4 (36.4)	7 (63.6)	11 (100)	
31–60	68 (37.0)	116 (63.0)	184 (100)		3 (23.1)	10 (76.9)	13 (100)	
> 60	20 (24.1)	63 (75.9)	83 (100)		7 (13.7)	44 (86.3)	51 (100)	
Pack-years:				0.002 ¹				
< 3	49 (27.4)	130 (72.6)	179 (100)					
3–5.99	61 (37.7)	101 (62.3)	162 (100)					
≥ 6	67 (46.5)	77 (53.5)	144 (100)					
Intent to quit:				< 0.001 ¹				0.059
Yes	146 (47.2)	163 (52.8)	309 (100)		9 (29.0)	22 (71.0)	31 (100)	
No	40 (19.6)	164 (80.4)	204 (100)		5 (11.6)	38 (88.4)	43 (100)	
Number of quit attempts:				0.025 ¹				0.017 ²
0	52 (22.8)	176 (77.2)	228 (100)		10 (15.6)	54 (84.4)	64 (100)	
1	29 (38.2)	47 (61.8)	76 (100)		2 (20.0)	8 (80.0)	10 (100)	
2	44 (41.5)	62 (58.5)	106 (100)		5 (71.4)	2 (28.6)	7 (100)	
3	29 (55.8)	23 (44.2)	52 (100)		0	5 (100)	5 (100)	
4	8 (66.7)	4 (33.3)	12 (100)		1 (20.0)	4 (80.0)	5 (100)	
≥ 5	24 (60.0)	16 (40.0)	40 (100)					
Self-assessment of nicotine addiction:				< 0.001 ¹				0.423 ²
No, totally disagree	2 (8.3)	22 (91.7)	24 (100)		6 (15.4)	33 (84.6)	39 (100)	
Yes, quite agree	29 (23.8)	93 (76.2)	122 (100)		6 (18.2)	27 (81.8)	33 (100)	
Yes, I'm addicted	61 (35.5)	111 (64.5)	172 (100)		4 (33.3)	8 (66.7)	12 (100)	
Totally agree	91 (48.9)	95 (51.1)	186 (100)		2 (40.0)	3 (60.0)	5 (100)	
I don't know	2 (22.2)	7 (77.8)	9 (100)		0	1 (100)	1 (100)	
All	186 (35.6)	328 (62.7)	514 (100)		18 (19.8)	73 (80.2)	91 (100)	

Notes: ¹Chi-squared test, ²Fisher's exact test, *HSI = Heaviness of Smoking Index. Total number of cases varies due to missing values.

All participants were conscript-aged males as a result of excluding a low number of females. As far as we know, we have few, if any, published data on smoking habits of Finnish women during their voluntary military service. Some 80% of Finnish men, at the age of 19–20 years, carry out their full-time service period, which varies from six to 12 months, so the results of this study can be generalized to the whole age group. Eighteen-year-old young Finnish males smoke daily more than females (25% vs. 23%), and the daily smoking in this age group has declined only since 2007 during follow-up surveys of three decades [23].

Young adults may underestimate how quickly nicotine addiction can develop [19,24]. Our results are in full agreement with a recent Finnish study [22]

in which 83% of 18-year-old daily smokers described themselves as being addicted to smoking. In addition to daily smokers, there is also a considerable group of occasional smokers with lower nicotine addiction; the risk for this group to start daily smoking is unknown. The rapid development of nicotine dependence needs to be taken seriously and efficient anti-smoking campaigns should be directed at young smokers, not only at adult chronic smokers with smoking histories over the decades.

Based on this study, over one-third of those who tried to quit had made more than three attempts. A remarkable number of daily smokers did not admit to any quit attempts even though some of them had used NRT. Moreover among young smokers there appears to be no known difference in cessation

maintenance as regards whether the quit attempt has been spontaneous or planned [25].

On the other hand, young adult smokers may not be familiar with all potential aids, and they evidently have little faith in their efficacy, but they seem to be ready to invest money in purchasing them if they want to quit [26]. There are controversial results about whether uncontrolled use of NRT without any counselling can cause harmful consequences [27,28], but it is likely that the combination of several other methods along with NRT is most efficient and safe.

The more the daily smokers had smoked in pack-years, the more they had made quit attempts. In our earlier study [29] which studied adult heavy smokers, a high (23%, two years) success rate could be achieved when the pharmacological aids were combined with motivational counselling. In the present study, in contrast it appears that most young smokers want to quit; they then try to quit with the help of NRT but without counselling, and thus relapse.

Factors associated with failures in smoking cessation are complex and difficult to resolve. One apparent difficulty is the recruitment problem. In Scotland, the implementation of cessation services was disappointing due to this problem [30]. The latest smoke-free legislation has led to a significant increase in smokers attempting to quit in England [31], so not only a personal desire to quit but also attitudes and other experiences may play role in predicting smoking cessation [32,33]. In our study, and also in some earlier studies, parental smoking was not associated with success or failure of smoking cessation in young adults [34].

Young adults for example may prefer to access cessation services from social media sources and in this way they may not resemble older smokers, although evidence is still lacking for this proposal [35–37]. New potential instruments for measuring loss of autonomy over smoking can be used as tools in individual cessation work [38,39]. There is insufficient evidence available to recommend any specific behavioural intervention for helping quitters and for preventing relapses [40].

These findings are based on a cross-sectional questionnaire. The study design did not include any randomized prospective follow-up to confirm cessation attempt episodes. However, this study provides an important piece of new information and knowledge on smoking cessation in young male adults.

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Ethical approval

This study was approved by the Ethical Committee of Lapland Central Hospital.

Declaration of interest

The authors report no conflict of interest.

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