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Electronic cigarette: use and perceptions among French military nurses in 2013

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Summary

AIMS: Paramedical personnel are exposed to tobacco smoking. Electronic cigarettes (e-cigarettes) may be considered as a lower-risk substitute for cigarettes. The aim of the study was to estimate the prevalence of e-cigarette use, the motives for use and the perceptions among French military nurses.

METHODS: A cross-sectional survey, using self-administered questionnaires, was conducted in 2013 among 300 students and instructors of the French school of military paramedical personnel. Prevalences of e-cigarette use among smokers and nonsmokers were compared using logistic regressions adjusted on age and gender.

RESULTS: The prevalence of smoking was 40% among the 200 responders. E-cigarette current use prevalence was 25% (6% daily users), without significant difference according to gender and age. Tobacco smokers reported significantly more e-cigarette current use (51% vs7%). Motives for e-cigarette use reported by smokers were curiosity (48%), intention to reduce tobacco consumption (43%) or to quit smoking (8%). Among users of both tobacco and e-cigarettes, 48% reported a significant decrease in tobacco consumption following e-cigarette initiation (average decrease of 5–10 cigarettes smoked per day; $p < 0.001$). Both tobacco smokers and nonsmokers (88%) estimated that e-cigarette use was potentially harmful for health, but it was perceived as less harmful than tobacco by 46%.

CONCLUSIONS: E-cigarette use among military nurses follows the trends observed in the general population in terms of prevalence and motives. E-cigarettes, which are seen as an attractive alternative to cigarettes, may contribute to a reduction in tobacco use among healthcare workers.

Key words: *armed forces; electronic cigarette; harm reduction; healthcare worker; tobacco*

Introduction

Smoking by healthcare professionals poses a barrier to interventions with patients. Although more than 94% of United States healthcare professionals are never-smokers, paramedical personnel are more exposed with a 13% smoking prevalence [1]. A study conducted in the US in 2006–2007 showed that between 10% and 21% of nurses and 19% of respiratory therapists were current smokers [2]. In France, despite the application of the national smoke-free law from 2007 [3], higher tobacco use prevalences are observed among healthcare professionals. A study conducted in 2008 in a French hospital showed that 29% of the staff smoked, a rate close to the 30% found in the general population [4–5]. Another survey conducted in 2009 even showed a 13% smoking prevalence among French certified physicians involved in infertility treatment, despite a certain awareness of the deleterious effects of tobacco [6]. Some authors hypothesised that tobacco use could be a consequence of an increased psychological burden at work [7].

Electronic cigarettes (e-cigarettes) are battery-operated devices designed to provide nicotine via a vaporised solution of propylene glycol and/or vegetable glycerine that is inhaled into the mouth and upper airways as with conventional cigarettes. As e-cigarettes do not burn tobacco, these products may be considered as a lower risk substitute for factory-made cigarettes and are targeted by increasing research [8–10]. In smokers not intending to quit, the use of e-cigarettes, with or without nicotine, was associated with a decrease of cigarette consumption and elicited enduring tobacco abstinence without causing significant side effects [11]. E-cigarettes may also contribute to prevention of relapse in former smokers and to smoking cessation in current smokers [12–13]. This potential in tobacco harm reduction implied that e-cigarettes became increasingly popular: sales of e-cigarettes have increased since 2007 in the US and may contribute to the recent decrease in cigarette sales [12]. A survey conducted in the United Kingdom in 2012 showed that 93% of current smokers and recent ex-smokers were aware of e-cigarettes, and that 20% used one currently [14]. Another study observed 11% e-cigarette ever-users among current-smoking US students [15]. A French population-based survey observed a 18% e-cigarette lifetime use in 2013, which is 2.5 times greater than in

2012 [16]. This proportion reached 50% among current tobacco smokers.

In this setting, we wanted to know if healthcare workers, a population expected to be particularly receptive to tobacco harm reduction, followed the trend for increasing e-cigarette use. Thus, the aim of the present study was to estimate the prevalence, the motives for use and the perceptions among French military nurses.

Methods

A cross-sectional survey, based on self-administered questionnaires, was conducted in 2013 in the French school of military paramedical personnel (EPPA), which trains nurses called to practice in military units with the exception of hospitals. Personnel present on the day of survey were included (students and instructors). The purpose of the survey was explained to the participants prior to questionnaire completion. The questionnaires, completed by the participants in a single session, included sociodemographic characteristics, smoking status, e-cigarette use status (lifetime, current and daily use), expectancies and perceptions about e-cigarette, and self-reported tobacco use frequency before and after cigarette initiation (for users of both tobacco and e-cigarette). Several methods were used to preserve participant anonymity: questionnaires were pre-identified with anonymous code numbers and participants had the possibility of confidential refusal to participate or the option to leave the questionnaire blank. This protocol was approved by the ethical committee of the French military health service. The analyses were performed using the Stata 11.1 software (Statacorp.). Proportions (e-cigarette use prevalences, use expectancies and perceptions) were compared between tobacco smokers and nonsmokers with the Fischer's exact test at the 5% significance level. Relationships between E-cigarette lifetime use and current use (entered as outcomes) and tobacco current use were modelled using logistic regressions adjusted on gender and age. Decrease in tobacco consumption was assessed using a generalised estimating equations (GEE) population-averaged model including tobacco use frequency as outcome, e-cigarette effect (self-reports before and after e-cigarette initiation), gender and age.

Results

Among the 300 subjects present on the day of survey, 259 agreed to participate. Fifty-nine questionnaires were then excluded owing to numerous missing data or incoherent responses. The final sample included 121 women (61%) and 79 men (39%). Thirty-tree subjects (17%) were instructors. The mean age of respondents was 27.5 years (median 24 years; interquartile range 22–30 years), 104 subjects (52%) being aged 18–24. The prevalence of tobacco current use was 40% (n = 79). Among current users, 41 (52%) planned to stop smoking, mostly to limit tobacco harms for themselves (59%) and their families (27%).

The e-cigarette lifetime use prevalence was 36% (n = 70), 49 subjects (25%) being current users. Twenty-nine (76%) were occasional users, 8 (18%) used e-cigarettes regularly and only 3 (6%) were daily users. Smokers reported more e-cigarette lifetime use (57% vs 22% among nonsmokers; $p < 0.001$) and current use (51% vs 7% among nonsmokers; $p < 0.001$), these relationships persisting after adjustment on gender and age (tables 1 and 2). E-cigarette lifetime use prevalence (43% among males and 32% among females) and current use prevalence (27% among males and 23% among females) did not significantly vary according to gender. Nurses aged 24 years or younger used e-cigarettes 2.2 times more often than older nurses ($p < 0.001$), but no relationship was observed between age and current use. Instructors did not significantly differ from students in terms of tobacco use (42% vs 39%; $p = 0.7$) and e-cigarette lifetime use (25% vs 39%; $p = 0.2$) and current use (15% vs 26%; $p = 0.3$).

As shown in table 1, among nonsmokers who used e-cigarettes, the motive for use mainly reported was an initial curiosity (7/9 or 78%). Motives for e-cigarette use reported by smokers were not only curiosity (48%) but also the intention to reduce tobacco consumption (43%) or to quit smoking (8%). Nineteen tobacco smokers who also used e-cigarettes (48%) reported a significant decrease in tobacco consumption following e-cigarette initiation (average decrease of 5–10 cigarettes smoked per day between the period preceding the onset of e-cigarette use and the day of survey; $p < 0.001$). This reported decrease remained significant after control for gender and age ($p < 0.001$). One subject reported to have quit smoking with e-cigarette use.

Finally, concerning perceptions towards e-cigarettes, 88% of respondents estimated that it was potentially harmful for health, this proportion being similar among tobacco smokers and no-smokers ($p = 0.5$). However, e-cigarette use was perceived as less harmful than conventional cigarette use by 46% of respondents, 46% reporting that they did not know if the risk would differ between e-cigarette and conventional cigarette. Nonsmokers reported to be significantly more disturbed by individuals who were smoking near them (80% vs 20% among smokers; $p < 0.001$), and this trend was also observed for the e-cigarette although it was better perceived: 41% among nonsmokers reported to be more disturbed by individuals who were using an e-cigarette near them versus 9% among smokers ($p < 0.001$).

Discussion

The present study, conducted among military healthcare workers, observed e-cigarette lifetime use prevalences close to those observed in the French general population in 2013 (57% among tobacco smokers and 22% among nonsmokers vs 50% and 16%, respectively, in the general population), with e-cigarette use mostly affecting young adults [16]. A 2014 French population-based survey showed respectively 48% and 60% e-cigarette lifetime use prevalences among occasional smokers and regular smokers [17]. The same observation was made concerning daily use prevalence (4% in our sample vs 3% in the French population). These results illustrate the increasing use of e-cigarettes in France as in other countries.

As in the French population, around 50% of users of both tobacco and e-cigarettes planned to quit smoking by this method in the present study. This motivation for use is observed in other countries, reaching 80% among UK users

of both tobacco and e-cigarettes [15]. In 2011, current US adolescent smokers who had ever used e-cigarettes were 1.5 more likely to intend to quit smoking within the next year [18]. This idea of harm reduction is enhanced by some researchers and constitutes the main marketing argument for e-cigarettes sellers [10, 19]. E-cigarettes, which preserve smoking sensations and gestures, are seen by many smokers as an attractive alternative to cigarettes, which could improve adherence to tobacco prevention programmes.

Tobacco constitutes a major public health concern in the armed forces. The prevalence of tobacco current use observed among military nurses (40%) appears close to that observed in the French armed forces as a whole (from 36% in the Air Force to 54% in the Army) [20], which is higher than in the general population [5]. Military personnel appear more likely to use tobacco after enrolment, this substance being associated with military culture, socialising and stress reduction [21–24]. In this particularly exposed population, use of e-cigarettes could contribute to tobacco harm reduction while preserving the sociocultural aspects of a "smoking-like" behaviour.

Indeed, if the present study, which used retrospective self-reported data from a small sample in a specific population, does not provide sufficient evidence concerning effectiveness of e-cigarette in tobacco reduction or cessation, it showed a decrease in reported tobacco consumption, around 5–10 cigarettes per day, among smokers who initiated e-cigarette use. This result, significant despite the low power of our study, is in line with some recent prospective cohorts: an Italian study reported a median decrease of around 10 cigarettes per day at 12 and 52 weeks following initiation of e-cigarette use [8], and a decrease of five cigarettes per day was observed at 1 month in a Swiss cohort [12]. A similar result was recently found in a large French population-based survey that observed a mean decrease of 8.9 cigarettes smoked per day among e-cigarette users [17]. A recent review reported evidence from two trials that e-cigarettes help smokers to stop smoking long-term or to reduce cigarette consumption compared with placebo e-cigarettes [25]. However, the authors of this review also suggest that the small number of trials, low event rates, wide confidence intervals around the estimates and the lack of biochemical studies of smoke intake may affect these findings.

The final response rate was 66.6% when including the 59 questionnaires excluded because of missing data. Indeed, these questionnaires appeared to be not accurately completely and could reflect secondary refusals to participate (subjects had this option or the option to leave the questionnaire blank). Even if our data are in line with previous research about e-cigarette prevalence, they have to be interpreted with caution. Moreover, our results among military nurses cannot formerly reflect e-cigarette among civilian healthcare workers because of the specificities of the military population.

In conclusion, e-cigarette use among military healthcare workers seems to follow the trends observed in the general population. Considering that this population is also at risk of tobacco use despite a good knowledge of its harms,

Table 1: E-cigarette use characteristics according to tobacco use status.

	Tobacco smokers n (%)	**Nonsmokers n (%)**	**p-value**
E-cigarette use prevalence (79 tobacco smokers and 114 non-smokers)[1]			
Lifetime use	45 (57.0)	25 (21.9)	<0.001
Current use	40 (50.6)	9 (7.4)	<0.001
– Occasionnal[2]	29 (36.7)	8 (6.6)	
– Regular[3]	8 (10.1)	1 (0.8)	
– Daily	3 (3.8)	0 (0.0)	
E-cigarette use expectancies among e-cigarette current users (40 tobacco smokers and 9 non-smokers)			
Curiosity	19 (47.5)	7 (77.8)	0.2
Intending to decrease smoking	17 (42.5)	–	
Intending to quit smoking	3 (7.5)	–	
Other	1 (2.5)	2 (22.2)	

[1] 7 missing data concerning e-cigarette use. [2] Occasional use: at least one use occasion during the past month. [3] Regular use: at least 10 use occasions during the past month.

Table 2: Factors associated with e-cigarette lifetime and current use – logistic regressions.

	Univariate OR	p-value	Multivariate OR	p-value
Model 1: lifetime use (n = 193)*				
Gender (female vs male)	0.6 (0.4–1.2)	0.14	0.5 (0.3–1.1)	0.08
Age (18-24 vs >24 years old)	1.8 (1.0–3.2)	0.06	**2.2 (1.1–4.4)**	**<0.05**
Tobacco current use (yes vs no)	**4.7 (2.5–8.8)**	**<0.001**	**4.9 (2.6–9.4)**	**<0.001**
Model 2: current use (n = 193)*				
Gender (female vs. male)	0.8 (0.4-1.5)	0.5	0.8 (0.4-1.7)	0.5
Age (18-24 vs. >24 years old)	1.5 (0.8-2.8)	0.3	1.7 (0.8-3.7)	0.2
Tobacco current use (yes vs. no)	**12.0 (5.3–26.9)**	**<0.001**	**12.3 (5.4–27.8)**	**<0.001**

OR = odds ratio and 95% confidence interval.
Bold values represent significant relationships at p <0.05.
* Seven missing data concerning e-cigarette use.

the good acceptance of e-cigarettes and the motivation that they induce may contribute to a tobacco reduction among healthcare workers. However, the design of the present study does not allow sufficient evidence to verify this hypothesis, which has to be tested in larger samples. It could also be interesting to explore to what extent healthcare workers who use e-cigarette encourage their patients to switch from cigarettes to e-cigarettes. Finally, most subjects also consider that e-cigarettes could be potentially harmful for health. Long-term safety of these products needs to be further explored before they can be promoted as a strategy of tobacco harm reduction.

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