E-cigarette dependence in former smoker: A Tunisian survey

Dépendance à la cigarette électronique chez les anciens fumeurs : une enquête tunisienne

Chirine Moussa, Nour Mahmoud, Houda Rouis, Amel Khattab , Ines Zendah, Sonia Maâlej

Pneumology Department I- Abderrahmen Mami Pneumology and Phthisiology Hospital-Faculty of Medicine of Tunis, University el Manar

Abstract

Introduction: Since its appearance, E-cigarette (EC) has experienced a strong craze among those seeking to reduce their conventional cigarette (CC) consumption.
Aim: This study aimed to compare EC to CC addictive power in actual users of EC and former smokers of CC.
Methods: We conducted a comparative cross-sectional study including 65 EC users and former smokers. They were collected on Facebook using a questionnaire including Fagrestrom score (FS).
Results: The average total of FS was estimated at 3.45 ± 2 with EC vs 3.89±2.45 with CC (p=0.04). The dependence on the EC was strong in 8%, average in 25%, and weak in 35% of cases. The predictive factors of a medium to high dependence on EC were the duration of its consumption (p=0.008) and the daily quantity of e-liquid (p=0.009). The presence of medical history was inversely correlated with EC addiction. The duration of EC use was the only independent factor of dependence with an OR of 4.25 IC95% [1.019-17.729]. EC users continued to smoke TC in 68% of cases.
Conclusion: Our study shows that even if it remains less important than that of CC, the dependence on EC is not negligible.

Key words: E-cigarette, Nicotine, Dependence

Résumé

Introduction: Depuis son apparition, la cigarette électronique (CE) a suscité un vif engouement chez ceux qui cherchent à réduire leur consommation de cigarettes conventionnelles (CC).
Objectif: Comparer le pouvoir addictif de l'CE à celui des CC chez les utilisateurs actuels d'CE et les anciens fumeurs de CC.
Méthodologie: Nous avons mené une étude transversale comparative comprenant 65 utilisateurs d'CE et anciens fumeurs. Ils ont été recrutés sur Facebook à l'aide d'un questionnaire comprenant le score de Fagrestrom (FS).
Résultats: La moyenne totale du FS a été estimée à 3,45 ± 2 avec l'EC contre 3,89 ± 2,45 avec les CC (p=0,04). La dépendance à l'CE était forte dans 8 % des cas, moyenne dans 25 % des cas et faible dans 35 % des cas. Les facteurs prédictifs d'une dépendance moyenne à élevée à l'CE étaient la durée de sa consommation (p=0,008) et la quantité quotidienne de liquide électronique (p=0,009). La présence d'un antécédent médical était inversement corrélée à la dépendance à l'CE. La durée de l'utilisation de l'CE était le seul facteur indépendant de la dépendance, avec un OR de 4,25 IC95% [1,019-17,729]. Les utilisateurs d'CE continuaient de fumer des CC dans 68 % des cas.
Conclusion: Notre étude montre que même si elle reste moins importante que celle des CC, la dépendance à l'CE n'est pas négligeable.

Mots clés: Cigarette électronique, Nicotine, Dépendance

Correspondance
Chirine Moussa
Pneumology Department I- Abderrahmen Mami Pneumology and Phthisiology Hospital-Faculty of Medicine of Tunis, University el Manar
Email: chirine.moussa22@gmail.com

INTRODUCTION

An E-cigarette (EC) is an electronic device that allows its users to smoke a flavored substance (e-liquid) containing nicotine in varying concentrations. The e-liquid contains propylene glycol, glycerin, and an aroma. EC users can change the taste, concentration of nicotine, and density of aerosols. (1)

Since its appearance in China in 2003, EC has experienced a strong craze among teenagers and young adults and its use is increasing over the years. (2) Worldwide vaping prevalence has been estimated at 41 million in 2018 and 55 million in 2021. (3) To our knowledge, no studies established so far in Tunisia. The main purpose for the initiation of vaping is generally to stop smoking conventional cigarettes (CC), but also peer pressure and curiosity. (4,5) EC effectiveness in smoking cessation was highly debated. (6) It has also been shown that the use of EC can lead to addiction. Few studies have studied this side effect despite its important impact on its user's life.

Our study aimed to compare the addictive power of EC in vapers who formerly smoked CC and to characterize predictive factors of EC dependence.

METHODS

We have established a comparative cross-sectional study in which we recruited 65 subjects via a questionnaire posed online on the Facebook social network. Data were collected on September 2021.

Inclusion Criteria: We included subjects aged over 18 years, former consumers of traditional cigarettes, and who currently use EC.

Individuals who have used EC for less than 3 months. This criterion ensures that participants have an adequate duration of EC usage to provide meaningful insights into their experiences.

Using the Google Forms application, we created a questionnaire designed to meet the objectives of our study. The questionnaire was developed in French and distributed on the social media platform Facebook, in various public groups as well as in a vapers' group.

The questionnaire took 15–20 minutes to complete. The response was anonymous and assessed the following informations:

- Socio-demographic data (gender, age, profession, pathological history, and Substance use)
- Characteristics of previous tobacco use (age at the start, number of cigarettes per day, duration of smoking, and the period since the stop)
- Characteristics of vape use (age of onset, circumstances of the first test, attempt to decrease and increase concentration, recourse to consume the CC with the vape, sensation of adverse effects, preferred taste, and nicotine concentration)
- Motivation to continue or stop smoking
- Dependency profile: CC and EC addiction was assessed by the Fagerstrom score (FC).

Dependency was defined according to FC in:

- No dependence: between 0 and 2
- Low dependency: between 3 and 4
- Average dependency: between 5 and 6
- High dependency: between 7 and 10

The data were analyzed using SPSS software version 21.0.

We calculated absolute frequencies and relative frequencies (percentages) for qualitative variables. We computed means, medians, and standard deviations, and determined the extreme values for quantitative variables.

Comparisons of percentages in independent series were conducted using the Pearson chi-square test. In cases of significance in the chi-square test and its non-validation, and for comparison of two percentages, the bilateral Fisher exact test was employed.

To identify factors independently associated with vaping dependence, we performed a multivariate analysis using stepwise logistic regression. The multivariate analysis allowed us to calculate adjusted Odds ratios, measuring the specific role of each factor. For logistic regression, we included in the initial model the variables with a significance level less than 0.2 in univariable analysis, as well as clinically relevant variables known from the literature.

The threshold for statistical significance was set at 0.05

RESULTS

Our population had a sex ratio of 8.9 male/1 female. The average age was estimated at 30±6 [18-51]. They were divided into functionaries (71%) and university students (25%). Three subjects (5%) had medical past such as asthma and depression. Alcohol consumption was found in 49% and cannabis in 7% of the population.

The age of onset of classic tobacco consumption was [15-20] y.o in 58% and between [20-25] y.o in 33% of cases. The number of cigarettes per day was <5 in 7% of cases, between 5 and 10 in 18%, between 10 and 20 in 50% and >20 in 25% of cases. The average duration of conventional smoking was 11±5 [1-30] years and the average time since quitting was 22±16 [1-36] months. The average duration of vaping was 28 ± 25 [3-72] months. (Table 1)

Table 1. Patient's clinical characteristics

Age	30±6 [18-51]
Sex ratio male/female	8.9
Occupation	
functionaries	46 (71%)
university students	16 (25%).
Unemployed	3 (5%)
Medical past	
Asthma	2 (3%)
Depression	1
Consumption	
Alcohol	32 (49%)
Cannabis	4 (7%)
Classic tobacco	
Age of onset	
< 15 years old	6 (9%)
[15,20] years old	37 (58%)
[20, 25] years old	22 (33%)
The average duration of conventional smoking	11±5 [1-30]
The average duration of withdrawal from traditional cigarettes	22 ±16 months. [1-36].
VAP	
The average duration of vaping was	28 ± 25 [3-72] months

The reasons for using vape were the desire to stop smoking in 73.8% (n=48), curiosity in 15.5% (n=10), encouragement from friends and family in 4.6% (n=3), to be part of a group of vapers in 3% (n=2) and the vape was a gift received in 3% of cases (n=2).

The most used nicotine concentrations of the e-liquid were 3mg (62%) . The average daily amount of liquid was 11 ±9 cc.

Vaping was well tolerated in 72% of the cases and mild side effects were reported in 28% of the cases. The most commonly reported adverse effects were: cough in 5 cases (8%), sore throat 4 cases (7%), headaches 3 cases (5%). (Table2)

Table 2. Distribution of the population according to the adverse effects experienced with vaping.

Cough:	5 (8%)
Sore Throat	4 (7%)
Headaches	3 (5%)
Nausea	2 (3%)
Choking Sensation:	4 (7%)
Chest Pain	5 (1%)
Tooth Discoloration	5 (1%)
Loss of Taste	5 (1%)
Aphthae	5 (1%)
Sneezing	5 (1%)
Dry Mucous Membranes	5 (1%)
Voice Hoarseness	5 (1%)

The vape users have resorted to consume conventional tobacco with vape in 68% of cases with varying frequency. It appears that the dependence on EC according to the FS was estimated to be high in 8% (n=5), medium in 25% (n=16), and low in 35% of cases (n=23). There was no dependence in 31% of our population (n=20). The mean scores for the majority of questions on the FS were statistically lower with vape except for questions 2 and 3. The average total score was estimated at 3.45 ± 2 with EC vs. 3.89 ± 2.45 with CC with a statistically significant difference p = 0.04. (Table3)

Table 3. Response to the different question of Fagrestrom score

Questionnaire items	**Cigarette**	**Vape**	**p**
Question 1	n=	n=	
before 5 min = 3 points	11	7	
6-30 min= 2 points	21	19	
31-60 min= 1 point	15	19	**0.002**
after 60 min=0 point	18	20	
Average	1.39±1.06	1.19±0.9	
Question 2	n=	n=	
Yes =1 point	27	24	
No =2 points	38	41	0,33
Average	0 ,4 ± 0,49	0,37 ± 0,48	
Question 3	n=	n=	
The first one= 1 point	40	31	
another one= 0 point	25	34	0,5
Average	0,61 +- 0,49	0,47 +- 0,5	
Question 4	n=	n=	
10 or less =0 point	29	18	
11 to 20 = 1 point	19	21	
21 to 30 = 2 points	15	12	**0,001**
21 or more = 3 points	2	14	
Average	0,81 ± 0 ,9	0,78 ± 0,74	
Question 5	n=	n=	
Yes = 1 point	28	24	
No = 0 points	37	41	**0,05**
Average	0,41 ± 0,49	0,37 ± 0,48	
Question 6	n=	n=	
Yes = 1 point	22	23	
No = 0 points	43	42	**0,05**
Average	0,32 ± 0,47	0,35 ± 0,48	
Total score			
Average:	**3,89 ± 2 ,45**	**3,45 ± 2**	**0,04**
No dependency	19 (30%)	20 (31%)	
Low dependency	16 (25%)	23 (35%)	
moderatedependency	21 (31%)	16 (25%)	
Strong dependence	9 (14%)	5 (7,8%)	

- Univariate analysis showed that duration of vape use (p=0.008) and daily amount of e-liquid (p=0.009) were risk factors for moderate to strong vape addiction.

The presence of past medical history was inversely correlated with vape dependence (p=0.004).

Multi-variate analysis concluded that the only predictor of moderate to heavy dependence was smoking duration >5.5 months (cut-off defined by the ROC curve) with an odds ratio of 4.250 95% CI [1.019-17.729] (Figure 1).

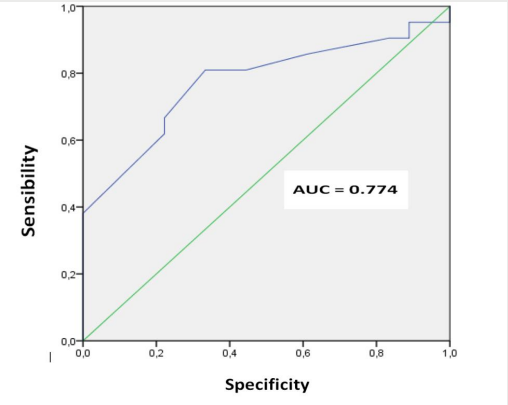

Figure 1. ROC curve

DISCUSSION

Tobacco use constitutes a global scourge, with its prevalence showing a significant increase. According to a meta-analysis encompassing Maghreb countries, the highest prevalence rates were observed in Tunisia, reaching an overall prevalence of 25% (95% CI [21% - 29%]) during the studied period. Morocco exhibited a prevalence of 16% (95% CI [14% - 18%]), while Algeria demonstrated a prevalence of 14% (95% CI [8% - 22%]). (7)

The lack of success in cessation endeavors has contributed to the stagnation and even the escalating prevalence of smoking in Tunisia, as evidenced by a Tunisian study involving 914 smokers. More than two-thirds of the participants (70%) had made at least one cessation attempt, with the longest attempt lasting over 6 months for 81 subjects (9%). Furthermore, the most recent quit attempt had occurred over 6 months ago for 486 smokers (53%). In 97% of cases, these previous cessation attempts were unaided and devoid of medical support.(8)

Currently, the EC is one of the most widely used methods for tobacco cessation, offering a convenient approach for smokers that is generally accessible without medical supervision.

Profile and motivation of vape users

Being perceived as a trendy accessory, vape mainly attracts young people. This is confirmed by most studies. The average age in a large-scale study including 33 countries and 1123 EC users was 43 ±11 years. (3) The mean age in our study was 30±6 years. The social network Facebook as a recruitment method, may have contributed to the selection of this particular age group.

The main reason (74% of cases) for the initiation of vaping in our study was to stop smoking. The other main reasons were peer pressure and curiosity. In two large-scale studies looking for the reason and profile of vapers, smoking cessation was the main purpose of the initiation of vaping.(5)

Cooper M et al. (9) compared the reasons for initiating vaping between adults and adolescents and found that smoking cessation was the main reason for both age groups. However, adolescents had other reasons such as discovering different flavors of e-liquid, helping them study, and trying «smoking tricks» which is a new trend on social networks. Among teenagers and young adults trends in the United States, a new product called «JUUL» or «pods» put on the market in 2015 is the new trend. This product tends to trivialize a strong consumption of nicotine since the concentration can reach 60mg /ml.(10)

In France, several laws come to frame the marketing and use of vape. The sale in stores is prohibited for minors. The pre-filled nicotine cartridges must not exceed 10 cc and the concentration of nicotine must not exceed 20mg / ml. (11)

In Tunisia, currently, there are no laws that concern the legislation of EC.

Effectiveness of vaping in smoking cessation:

Even if the main reason for EC use remains smoking cessation, the effectiveness of this tool in this matter remains very controversial. Among the first studies conducted in New Zealand published in 2013, 657 smoking subjects motivated to quit were included. It is a randomized study that divided the population according to the means of withdrawal into three groups (G1: n=289 EC with nicotine; G2: n=295 patches; G3: n=73 EC without nicotine). The control at 6 months showed a withdrawal rate of 7.3% for G1, 5.8% for G2 and 4.1% for G3 with no statically significant difference. This study did not retain the superiority of the EC over nicotine patches. The EC used were of the first generation which are probably less effective than the others.(2)

A randomized controlled trial published in January 2019 was conducted in 886 adult smokers who were motivated to quit and consulted tobacco centers. Participants were divided into two groups. Subjects in the first group received nicotine replacement therapy (patch, lozenges ...) for three months, sometimes combined. The subjects of the second group received a second generation EC with an e-liquid containing a maximum of 18mg/ml of nicotine. The main criterion was continuous abstinence at one year, confirmed by a measurement of exhaled CO. This study showed that there was more cessation in the e-cigarette group than in the other nicotine replacement therapy group (18% vs. 9.9%; p<0.001). (12)

In our study, even if the effectiveness of smoking cessation was not our main objective, 32.3% were able to stop smoking completely and 56.9% were able to reduce their consumption. These results could be better if an adequate follow-up by a health professional trained in tabacology for the smoking cessation process was done.

Vape addiction:

Addiction is a substance use disorder. Loss of control is the main characteristic of this behavior. It is defined by Auriacombe et al. (11)as a deregulated pattern of use of a source of gratification which may be a substance or a behavior. According to the criteria of the DSM 5 (Diagnostic and statistical manual of mental disorders), it is a chronic disease of control dysfunction.(13) These same criteria consider that the clinical signs of addiction are mainly relapse and craving, which is «the irrepressible desire to consume a substance».(13)

The risk of developing an addiction to tobacco is very high. Based on the DSM 5 criteria, a study compared the addictive power of different psychoaffective substances. Tobacco was the most addictive, ahead of alcohol, cocaine and cannabis, with a 67.5% risk of addiction. (14)

The addictive power of smoking is mainly due to nicotine that binds to cholinergic receptors of the brain reward system: the mesocorticolimbic dopamine system.(15)

Sensory and environmental elements accentuate this phenomenon.

Therefore, the EC which shares with tobacco its addictive elements can itself generate an addiction. Since its use is not always legally or medically regulated, several studies, especially among adolescents, have shown a misuse of the quantity of nicotine in the e-liquid.(16)

The theoretical addictive potential of vape and the fact that it is not devoid of harmful effects motivated our study. We have looked for the addiction to the vape by comparing it to the classic cigarette through an objective means which is the score of Fagrestrom. Few studies have focused on this emblematic subject.

A Malaysian pilot study showed that the Fagerstrom score is adaptable to EC.(17) This study proved the existence of a correlation between the withdrawal from the vape at 12 months and the low dependence on this score at the beginning.

Our study has shown that the dependence to the vape is not negligible. Vape users were non-dependent in 31.3% of cases, weakly dependent in 35% of cases, of medium dependence in 25% of cases and of strong dependence in 7.8% of cases.

This dependence remains less important compared to the dependence on the traditional cigarette. The average final score was 3.45 ± 2 with vape vs 3.89 ± 2 .45 with conventional cigarettes with a statistically significant difference.

The first study evaluating the dependence to vape was published in 2018 by an American team recruited 117 subjects who were not necessarily former smokers. The Fagrestrom score was calculated. Unlike our study the average dependence was the most found 45.5%. The dependence to vape was not correlated with the former consumption of conventional smoking and it was more important with vape than with tobacco. This same result was also found with the Fisher's Exact test which emphasizes the important craving effect of vape.(18)

Browne et al(19) proceeded in their work to compare the dependence to the vape and to the traditional cigarette in 350 former smokers thanks to the score of Fagrestrom. The dependence to the vape was statistically less important than that to the traditional cigarette. This study did not find a correlation between addiction and the amount of nicotine used. Contrary to our study which highlights the correlation between the amount of e-liquid used per day and the addiction but this factor does not emerge as an independent factor on the multivariate analysis.

The duration of vaping was the only independent factor of high addiction to vape. This result emphasizes the importance of supervising vape use to minimize the duration of use and decrease the risk of high dependence.

Browne et al(19) consider that the Fagerstrom score is not entirely appropriate for vape. In fact, the motivations for vaping are different from those of smoking, and there is an aspect of fun by the taste of the liquid as well as a certain ease of vaping in the environment and indoors since it is less unpleasant. Similarly, in our study the answer to question 6 shows that the consumption of vape in bed in case of illness was more important than with the classic cigarette. This can be explained by the ease of vaping and the less unpleasant character compared to traditional tobacco.

Question 4 of the questionnaire is not as suitable for vape as the number of cigarettes was compared with the number of puffs while the nicotine content is not comparable which explains why the score of this question was higher with vape.

A recent study published in January 2021 and to our knowledge the only one studying vape withdrawal. All participants were followed in a specialized center. They were divided into 3 groups according to the means of withdrawal: G1: nicotine replacement therapy, G2: strategy of reducing the amount of nicotine with vape and G3: psychological support only. The most effective method statistically was G2 with 77.8% of withdrawal (20).

In our study, 61.5% of candidates reported their motivation to stop using e-cigarettes.

The limitations of our study were the heterogeneity of the group of vapers in terms of nicotine consumption and the small sample. Another selection bias was the socio-cultural level of our population, which is made up of educated individuals who are fluent in French and have access to Facebook.

In addition, the addiction score we used is a score initially established for CC and not specific to vape.

The strong point of our study was especially its innovative character since it is to our knowledge the first Tunisian study interested in the vape

This work emphasizes the need to start multi-center, multidisciplinary studies to seek to develop a score of dependence specific to steam.

Through this work, we also encourage to seek to develop legislation that regulates the marketing and consumption of this tool as the number of vapors continues to increase day by day especially among young people and knowing that the long-term consequences are unknown.

CONCLUSION

The EC is a tool increasingly consumed by young people being perceived as a trend. In Tunisia there is a lack of legislation that codifies the commercialization and the use of EC.

Nicotine, which is often present in the e-liquids used in electronic cigarettes is a substance of strong addictive power. The regular use of the electronic cigarette can lead to a habituation to the gesture of vapoter. Our study concluded that dependence to EC estimated by the FC was less important than CC but still significant. The pedictive factor of a moderate to heavy dependence was the long period of its use.

To conclude, EC may be one of the solutions to stop smoking still; smoking cessation must be conducted by a health professional to decide on the best way do it. More prospective studies are required to develop a specific a score which quantifies the dependence to EC.

REFERENCES

1. Caponnetto P, Campagna D, Cibella F, Morjaria JB, Caruso M, Russo C, et al. EffiCiency and Safety of an eLectronic cigAreTte (ECLAT) as Tobacco Cigarettes Substitute: A Prospective 12-Month Randomized Control Design Study. Le Foll B, éditeur. PLoS ONE. 24 juin 2013;8(6):e66317.
2. Bullen C, Howe C, Laugesen M, McRobbie H, Parag V, Williman J, et al. Electronic cigarettes for smoking cessation: a randomised controlled trial. The Lancet. nov 2013;382(9905):1629-37.
3. Javelle E. Electronic cigarette and vaping should be discouraged during the new coronavirus SARS-CoV-2 pandemic. Arch Toxicol. juin 2020;94(6):2261-2.
4. Rutten LJF, Blake KD, Agunwamba AA, Grana RA, Wilson PM, Ebbert JO, et al. Use of E-Cigarettes Among Current Smokers: Associations Among Reasons for Use, Quit Intentions, and Current Tobacco Use. Nicotine Tob Res Off J Soc Res Nicotine Tob. oct 2015;17(10):1228-34.
5. Hummel K, Hoving C, Nagelhout GE, de Vries H, van den Putte B, Candel MJJM, et al. Prevalence and reasons for use of electronic cigarettes among smokers: Findings from the International Tobacco Control (ITC) Netherlands Survey. Int J Drug Policy. juin 2015;26(6):601-8.
6. Balfour DJK, Benowitz NL, Colby SM, Hatsukami DK, Lando HA, Leischow SJ, et al. Balancing Consideration of the Risks and Benefits of E-Cigarettes. Am J Public Health. sept 2021;111(9):1661-72.
7. Serhier Z, Bendahhou K, Soulimane A, Othmani MB, Abdelaziz AB. Prévalence du tabagisme au Maghreb: Revue systématique de la littérature et méta analyse Prevalence of smoking in the Maghreb: a systematic review and meta-analysis. Tunis Med. 2018;96.
8. Asma SB, Sana E, Iness B, Chahida H, Aroua BS, Kamel BS, et al. les attitudes envers l'arrêt du tabac chez les fumeurs adultes. Tunis Med. 2015;93.
9. Cooper M, Harrell MB, Perry CL. Comparing young adults to older adults in e-cigarette perceptions and motivations for use: implications for health communication: Table I. Health Educ Res. août 2016;31(4):429-38.
10. Agence nationale de sécurité du médicament et des produits de santé. Informations réglementaires relatives à la cigarette électronique - Point d'Information. 2016.
11. Auriacombe M, Dubernet J, Sarram S, Grelot B, Fatseas M, Dalouède J. Le craving : une nouvelle clinique diagnostique et thérapeutique pour l'addiction – Implications pour le trouble de l'usage des opioïdes. Le Courrier des Addictions. 2018;20(1 (Suppl)):S4-7.
12. Hajek P, Phillips-Waller A, Przulj D, Pesola F, Myers Smith K, Bisal N, et al. A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy. N Engl J Med. 14 févr 2019;380(7):629-37.
13. Marques P, Piqueras L, Sanz MJ. An updated overview of e-cigarette impact on human health. Respir Res. déc 2021;22(1):151.
14. Centers for Disease Control and Prevention (CDC). Fixed obstructive lung disease among workers in the flavor-manufacturing industry--California, 2004-2007. MMWR Morb Mortal Wkly Rep. 27 avr 2007;56(16):389-93.
15. Choi K, Bernat D. E-Cigarette Use Among Florida Youth With and Without Asthma. Am J Prev Med. oct 2016;51(4):446-53.
16. Honeycutt L, Huerne K, Miller A, Wennberg E, Filion KB, Grad R, et al. A systematic review of the effects of e-cigarette use on lung function. Npj Prim Care Respir Med. 22 oct 2022;32(1):45.
17. Rahman A, Mohamed MN, Jamshed S, Mahmood S, Baig MI. The development and assessment of modified Fagerstrom test for nicotine dependence scale among Malaysian single electronic cigarette users. J Pharm Bioallied Sci. 2020;12(6):671.
18. Johnson JM, Muilenburg JL, Rathbun SL, Yu X, Naeher LP, Wang JS. Elevated Nicotine Dependence Scores among Electronic Cigarette Users at an Electronic Cigarette Convention. J Community Health. févr 2018;43(1):164-74.
19. Browne M, Todd DG. Then and now: Consumption and dependence in e-cigarette users who formerly smoked cigarettes. Addict Behav. janv 2018;76:113-21.
20. Sahr M, Kelsh S, Blower N, Sohn M. Pilot Study of Electronic Nicotine Delivery Systems (ENDS) Cessation Methods. Pharmacy. 14 janv 2021;9(1):21.