

Vaping E-Cigarettes: Challenges

Divya A*

Ratnam Institute of Pharmacy, Nellore, Andhra Pradesh, India

Review Article

Received: 20/02/2017

Revised: 14/03/2017

Accepted: 20/03/2017

*For Correspondence

Divya A, Ratnam Institute of Pharmacy, Nellore, Andhra Pradesh, Tel: +91 9888565898.

E-mail:

divyapharma15@gmail.com

Keywords: e-cigs, Nicotine, Vaping

ABSTRACT

Electronic cigarettes are also referred as e-cigarettes. In order to reduce the Tobacco harm, Electronic cigarettes are introduced. It is a healthier alternative to quit smoking and works as a Tobacco substitute. By establishing proper quality and standards it can able to reduce the devastating effects of Tobacco. Electronic cigarettes are electronic devices consist of vaporized liquid. Recently health benefits are expected in smokers who switch from Tobacco to e-cigs. However, in some cases it is unknown fact whether vaping of e-cigs will reduce or enhance nicotine addiction. Health care community is responsible to face new challenges on e-cigarettes. Proper awareness on e-cigs should be globalized so that consumer health can be improved better.

INTRODUCTION

Electronic cigarettes are devices which often resembling cigarettes, pipes. These were designed to emit doses of vaporized nicotine. Earlier, cigarettes are made up of finely powdered tobacco leaves which were rolled in thin paper. Now, these are available as an alternative for smokers who can able to avoid smoke. Tobacco is the main ingredient in cigarettes [1-15].

CONSEQUENCES OF CIGARETTES

Approximately there are 600 ingredients are present in Cigarettes. They can create 7000 chemicals when they burnt. Among those, at least 69 chemicals are known to be carcinogenic. Not only it cause cancer it will cause serious health issues [16-30]. The major chemicals are Nicotine, Carbon monoxide and Tar. Nicotine is the strong poisonous drug which is an ingredient in insecticides. Tar is the oily materials which will sticks to blacken the Lungs. Carbon monoxide is the poisonous gas which interferes with respiratory and circulatory systems. Nicotine makes the people to get hooked with Smoking while the Carbon monoxide and Tar really do harms. Immediate damage occurs to arteries for Smoking. It slowly poisons the lungs and thereby weakens Immune system [31-55].

COMPONENTS OF ELECTRONIC CIGARETTES

Electronic cigarettes contain liquid nicotine in measured doses ranges from 0 mg to 25 mg. In this, smoke is replaced by clean vapour. Paper and filters are replaced by reusable lithium ion batteries. An electronic cigarette uses vapour and heat to vaporize liquid tobacco solution [56-70].

Rechargeable Lithium ion Battery

This is the main component and acts as a critical part for the Electronic cigarettes. A sensor is present inside the battery which acts when a person begins inhaling.



Figure 1. Components of e-cigarette

Nicotine cartridge

Cartridge is the main component which holds liquid nicotine. It appears as the mouth piece of the e-cigs, and the other end is connected to battery (Figure 1).

Atomization chamber

This atomizer is placed in between the Cartridge and Battery. Using small heating coil, atomizer heats the Liquid tobacco.

STATISTICS OF CIGARETTES USAGE

In recent years usage of e-cigarettes by youth has increased gradually [71-85].

Table 1. Usage of e-cigarettes among different group of people nationwide

Age group	2013	2014
11-14 years	1.1%	3.9%
14-18 years	4.5%	13.4%
25-44 years	15%	20%

Table 1 indicates e-cigarettes consumption has tripled in high school aged students [86-98].

- In United States, over 20% of all deaths were caused due to Tobacco.
- Worldwide there are more than 600,000 Non-smokers die every year due to second hand smoke.
- In between 1990 and 2009, cigarette consumption is decreased by 26% in European countries whereas in African countries it was increased by 57%.

REFERENCES

1. US Centers for Disease Control and Prevention (CDC). Tobacco Use among Middle and High School Students United States, 2011-2015. Morbidity and Mortality Weekly Report (MMWR). 2016;65:361-367.
2. CDC. Frequency of Tobacco Use Among Middle and High School Students—United States, 2014. Morbidity and Mortality Weekly Report (MMWR). 2015;64:1061-1065.
3. Bunnell R, et al. Intentions to smoke cigarettes among never-smoking U.S. middle and high school electronic cigarette users, National Youth Tobacco Survey, 2011-2013. Nicotine & Tobacco Research. 2014;pii:ntu166.
4. Barrington-Trimis JL, et al. E-Cigarettes and Future Cigarette Use. Pediatrics. 2016;138(1).
5. Wills TA, et al. Ecigarette use is differentially related to smoking onset among lower risk adolescents. Tobacco Control. 2016.
6. King BA, et al. Trends in Awareness and Use of E-cigarettes Among US Adults, 2010-2013. Nicotine and Tobacco Research. 2014.

7. Schoenborn CA and Gindi RM. Electronic Cigarette Use Among Adults: United States, 2014, National Center on Health Statistics (NCHS) Data Brief, No. 217. 2015.
8. Electronic Cigarettes: Use Among Adults and Youth / 4 13 CDC. Quick Stats: Cigarette Smoking Status Among Current Adult E-Cigarette Users, by Age Group—National Health Interview Survey, United States, 2015. Morbidity and Mortality Weekly Report. 65:1177.
9. King BA, et al. Awareness and Ever Use of Electronic Cigarettes Among U.S. Adults, 2010-2011. *Nicotine & Tobacco Research*. 2013;15:1623-1627.
10. Bullen C, et al. Electronic cigarettes for smoking cessation: a randomised controlled trial. *The Lancet*. 2013;382:1629-1637.
11. Capanetto P, et al. Efficiency and Safety of an eElectronic cigAreTte (ECLAT) as tobacco cigarettes substitute: a prospective 12-month pilot study. *PloS One*. 2013;8:e66317.
12. Biener L and J Lee Hargrave. A Longitudinal Study of Electronic Cigarette Use in a Population-based Sample of Adult Smokers: Association with Smoking Cessation and Motivation to Quit. *Nicotine & Tobacco Research*. 2014.
13. Adkison S, et al. Electronic Nicotine Delivery Systems: International Tobacco Control Four-Country Survey," *American Journal of Preventive Medicine*. 2013;44:207-215.
14. Vickerman KA, et al. Use of Electronic Cigarettes Among State Tobacco Cessation Quitline Callers. *Nicotine & Tobacco Research*. 2013;15:1787-1791.
15. Tverdal A and Bjartveit K. Health Consequences of Smoking 1-4 Cigarettes per Day. *Tobacco control*. 2005;14.
16. Schane RE, et al. Health Effects of Light and Intermittent Smoking: A Review, *Circulation*. 2010;121:1518-1522.
17. Tverdal A and Bjartveit K. Health consequences of reduced daily cigarette consumption. *Tobacco Control*. 2006;15:472-480.
18. Brose LS, et al. Perceived relative harm of electronic cigarettes over time and impact on subsequent use. A survey with 1-year and 2-year follow-ups. *Drug and Alcohol Dependence*. 2015;157:106-111.
19. Przulj D, et al. Effects of Nicotine-Free E-Cigarettes on Urges to Smoke and Cigarette Withdrawal Symptoms: A Randomised Cross-Over Study. *J Addict Res Ther*. 2016;7:259.
20. Hajek P, et al. Adding E-Cigarettes to Specialist Stop-Smoking Treatment: City of London Pilot Project. *J Addict Res Ther*. 2015;6:244.
21. Dautzenberg B and Bricard D. Real-Time Characterization of E-Cigarettes Use: The 1 Million Puffs Study. *J Addict Res Ther*. 2015;6:229.
22. Elzinga S, et al. The Conversion and Transfer of Cannabinoids from Cannabis to Smoke Stream in Cigarettes. *Nat Prod Chem Res*. 2015;3:163.
23. Maria Jose MB, et al. Mentholated Cigarettes are Related With Abnormal Brain-Derived Neurotrophic Factor Levels among Smokers Living with HIV. *J Alcohol Drug Depend*. 2014;2:180.
24. Jansen E, et al. Simple Determination of Sugars in Cigarettes. *J Anal Bioanal Tech*. 2014;5:219.
25. Koszowski B, et al. Experimentally Switching from Factory made to Self-Made Cigarettes: A Preliminary Study of Perceptions, Toxicant Exposure and Smoking Behavior. *J Addict Res Ther*. 2014;5:179.
26. Chen G. Nanotube-Based Controlled Drug Delivery. *Pharmaceut Anal Acta*. 2012;3:e136.
27. Baya B, et al. Relationship between HIV Positive Status Announcement and Smoking among Infected-Individuals in Bamako, Mali. *J AIDS Clin Res*. 2016;7:617.
28. Manzano C, et al. Maternal Smoking during Pregnancy and Its Impact on Postnatal Neurodevelopment. *Clinics Mother Child Health*. 2016;13:249.
29. Ghadban R, et al. Smoking Behavior in Arab Americans: A Systematic Review. *J Community Med Health Educ*. 2016;6:462.
30. Shakeel S and Farrukh U Dental Patients' Apprehensions about the Effects of Smoking and Role of Dentists in Smoking Cessation Activities. *J Med Diagn Meth*. 2016;5:1000225.
31. Decker KP, et al. Medication Treatment for Smoking Cessation in Patients with Comorbid Medical or Psychiatric Problems during Substance Use Rehabilitation. *J Alcohol Drug Depend*. 2016;4:243.
32. Keizer I, et al. A Short Motivational Program Based on Temporary Smoking Abstinence: Towards Increased Self-Efficacy to Quit in Psychiatric Inpatients. *J Addict Res Ther*. 2016;7:289.
33. Onur Ozturk and Izzet Fidanci. The Relationship Between Smoking and Cancer: Mini Review. *Cancer Surg*. 2016;1: 108.
34. Kuzmenko T, et al. The Role of Genetic Polymorphism of IL-4 (C-589T) and TNfa (G-308A) and Regular Passive Smoking in Clinical Manifestations of Pneumonia in Infants. *Clin Pediatr*. 2016;1:106.
35. Apple RW, et al. Smoking *Cannabis* is Especially Dangerous for Youth Diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD). *J Community Med Health Educ*. 2016;6:451.
36. Singh D. Effect of Cigarette Smoking on Serum Lipid Profile in Male Population of Udaipur. *Biochem Anal Biochem*. 2016;5:283.

37. Singh D.) Effect of Cigarette Smoking on Serum Homocysteine and Vitamin B12 Level in Male Population of Udaipur. *Biochem Anal Biochem.* 2016;5:282.
38. Akcay S and Er Dedekarginoglu B. Smoking Cessation in Lung Cancer. *J Lung Cancer Diagn Treat.* 2016;1:105.
39. Lopez PJT, et al. Pharmacoeconomic Analysis of the Therapies Used in the Treatment of Smoking in a Specialized Unit. *J Pulm Respir Med.* 2016;6:347.
40. Woods JJ, et al. Cigarette Smoking: A Causal Factor for Alzheimers Disease?. *JGerontol Geriatr Res.* 2016;5:286.
41. duPont NC, et al. Developing a Smoking Cessation Intervention for Low Income and Minority Women. *J Women's Health Care.* 2016;5:309.
42. Woods JJ, et al. Cigarette Smoking: A Causal Factor for Alzheimers Disease? *JGerontol Geriatr Res.* 2016;5:286.
43. Farrukh U, et al. Dentists' Practice and Perceived Barriers towards Smoking Cessation and Intervention in Karachi, Pakistan. *J Pharma Care Health Sys.* 2016;3:151.
44. Saleh M. Smoking: Disease or Therapy. *J Addict Res Ther.* 2016;7:269.
45. Niimori-Kita K, et al. Nuclear Phosphoproteomics Features the Novel Smoking Markers in Mouse Lung Tissue Following Subacute Phase Exposure to Tobacco Smoke. *J Bioanal Biomed.* 2016;8:009-016.
46. De Silva WDAS, et al. A Randomised Single-Blinded Controlled Trial on the Effectiveness of Brief Advice on Smoking Cessation among Tertiary Students in Malaysia. *J Health Med Inform.* 2016;7:217.
47. Hamadeh RR. Water Pipe Tobacco Smoking among Females: A Middle Eastern or a Global Epidemic? *J Women's Health Care.* 2016;5:e119.
48. Leone S, et al. Could Smokers' Socio-Demographic and Housing Factors Affect and Influence the Choice Between Smoking Cessation Therapies? *Clin Pharmacol Biopharm.* 2016;5:152.
49. Spas JJ, et al. Targeting Smoking Cessation and Weight Loss Simultaneously: An Acceptance and Commitment Therapy (ACT) Approach. *J Addict Res Ther.* 2015;6:243.
50. Zyambo CM, et al. Factors Associated With Smoking Status among HIV-Positive Patients in Routine Clinical Care. *J AIDS Clin Res.* 2015;6:480.
51. Zaky EA. Second Hand Smoking and Pediatric Mental Disorders; is there a Link? A Commentary. *Int Psychol J Sch Cog.* 2015;S1:005.
52. Asmaro D, et al. Behavioral and Electrophysiological Responses to Tobacco-Related Words in a Smoking Stroop Task Discriminate between Relapse or Abstinence following a One-Month Quit Attempt. *J Alcohol Drug Depend.* 2015;3:206.
53. Dereje N, et al. Prevalence and Predictors of Cigarette Smoking among Adolescents of Ethiopia: School Based Cross Sectional Survey. *J Child Adolesc Behav.* 2015;3:182.
54. FitzGerald MJ, et al. Perception, Cultural Norm, and Self-Efficacy: Edges of Smoking Habit Triangle among Chinese Adult Smokers. *J Community Med Health Educ.* 2014;5:324.
55. Cantin C, et al. Opportunities to Improve the Role of Primary Care Nurses in Increasing the Uptake of Evidence-Based Smoking Cessation Interventions for Pregnant Women: An Exploratory Survey. *Primary Health Care.* 2014;4:174.
56. Teklu D and Lema A. Optimization of Time and Temperature for Smoking of Nile Tilapia for a Better Preservation of Protein and Gross Energy Value. *J Nutr Food Sci.* 2015;5:341.
57. Jansen EHJM, et al. The Effect of Smoking on Biomarkers of (Anti) oxidant Status. *J Mol Biomark Diagn.* 2014;5:207.
58. Kinney GL, et al. The Protective Effect of Hispanic Ethnicity on Chronic Obstructive Pulmonary Disease Mortality is Mitigated by Smoking Behavior. *J Pulm Respir Med.* 2014;4:220.
59. Adak M. Effects of Smoking and Need for Cessation: Biochemical and Pharmacological Feedback. *Biochem Pharmacol.* 2014;3:145.
60. Gardner AW. Impaired Peripheral Circulation in Veterans with Claudication is Associated with Smoking. *Angiol.* 2014;3:133.
61. Campbell S, et al. Personality and Smoking Behaviour of Non-Smokers, Previous Smokers, and Habitual Smokers. *J Addict Res Ther.* 2014;5:191.
62. Meszaros ZS, et al. Smoking Severity and Functional MRI Results In Schizophrenia: A Case-Series. *J Addict Res Ther.* 2014;5:189.
63. Cai X, et al. Untargeted Lipidomic Profiling of Human Plasma Reveals Differences due to Race, Gender and Smoking Status. *Metabolomics.* 2014;4:131.
64. Zdanowicz MM and Adams PW. The Pharmacogenetics of Nicotine Dependence and Smoking Cessation Therapies. *J Pharmacogenomics Pharmacoproteomics.* 2014;5:138.
65. Iwai T and Umeda M. Smoking, Periodontitis and Vascular Disease -Collaboration Study with Dentists and Vascular Surgeons. *J Interdiscipl Med Dent Sci.* 2014;2:113.

66. Jradi H and Al-Shehri A. Knowledge about Tobacco Smoking among Medical Students in Saudi Arabia: Findings from Three Medical Schools. *Epidemiol.* 2014;4:150.
67. Talaat HS. Passive Smoking: A Possible Risk Factor for Development of Minimal Hearing Loss in Children. *Commun Disord Deaf Stud Hearing Aids.* 2014; 2:107.
68. Rajkumar A, et al. Pure Signet-ring Cell Carcinoma of Lung by Fine Needle Aspiration in a Smoking Asian American: Case Report and Literature Review. *J Clin Exp Pathol.* 2013;4:155.
69. Stough C, et al. An Open Label Study investigating the Efficacy of Hypericum perforatum Special Extract (ZE117), Nicotine Patches and Combination (ZE117)/Nicotine Patches for Smoking Cessation. *Altern Integr Med.* 2013;2:147.
70. Gaafar MA and Basiony LA. Pattern of Smoking Habit and Quit Attempts among Industrial Workers in Kuwait. *Occup Med Health Aff.* 2013;1:115.
71. Chen H, et al. Fetal Programming of Renal Development–Influence of Maternal Smoking. *J Diabetes Metab.* 2013;S9:003.
72. Lahdentausta L, et al. The Effect of Smoking on Diagnostic Value of Serum Matrix Metalloproteinase-8 in Acute Coronary Syndrome. *J Mol Biomark Diagn.* 2013;S4:002.
73. Mohammadpoorasi A, et al. Pattern of Hookah Smoking in Tabriz, Iran. *J Addict Res Ther.* 2013;4:143.
74. Shadid HM and Hossain SZ. Understanding Smoking Behaviour among Secondary School Students in Amman, Jordan: A Qualitative Study. *J Community Med Health Educ.* 2013;3:199.
75. Fentie EG and Emire SA. Effect of Hot Smoking Process Parameters on Microbiological and Shelf Stability of Nile Tilapia (*Oreochromis niloticus*) Fillets. *J Food Process Technol.* 2013;4:196.
76. Ragab AR and Al-Mazroua MK. Passive Cannabis Smoking Resulting in a Coma in a 16 Month Old Infant. *J Clin Case Rep.* 2012;2:237.
77. Chen X and Lin F. Estimating Transitional Probabilities with Cross-Sectional Data to Assess Smoking Behavior Progression: A Validation Analysis. *J Biomet Biostat.* 2012;S1:004.
78. Mostafa T. Smoking in Andrology: State of Art. *Andrology.* 2012;1:e108.
79. Huang C, et al. Smoking Susceptibility and its Predictors among Adolescents in China: Evidence from Ningbo City. *J Addict Res Ther.* 2012;S8:004.
80. Sahin A, et al. Is Hypertrophic Osteoarthropathy Associated with Smoking? *J Clin Case Rep.* 2012;2:145.
81. Helvacı MR, et al. Atherosclerotic Effects of Smoking and Excess Weight. *J Obes Wt Loss Ther.* 2012;2:145.
82. Mishra S, et al. Smoking Related Changes in Neurotransmitters in African Americans. *J Bioprocess Biotechniq.* 2011;1:e106.
83. Wu IH, et al. Cigarette Smoking among Taiwanese Adults. *Epidemiol.* 2011;1:107.
84. Yu Y, et al. Beliefs in Effectiveness of Various Smoking Cessation Interventions among Chinese Adult Smokers. *Epidemiol.* 2011;1:106.
85. Abughosh S, et al. Predictors of Intention to Quit Cigarette Smoking among Jordanian Adult. *Epidemiol.* 2011;1:103.
86. Khara M and Okoli CTC. Smoking Cessation Outcomes among Individuals with Substance Use and/or Psychiatric Disorders. *J Addict Res Ther.* 2011;2:115.
87. Yamin CK, et al. E-cigarettes: a rapidly growing internet phenomenon. *Ann Intern Med.* 2010;153:607–609.
88. Regan AK, et al. Electronic nicotine delivery systems: adult use and awareness of the ‘e-cigarette’ in the USA. *Tob Control.* 2011;22:19–23.
89. Farsalinos KE, et al. Comparison of the cytotoxic potential of cigarette smoke and electronic cigarette vapour extract on cultured myocardial cells. *Int J Environ Res Public Health.* 2013;10:5146–5162.
90. Romagna G, et al. Cytotoxicity evaluation of electronic cigarette vapor extract on cultured mammalian fibroblasts (ClearStream-LIFE): comparison with tobacco cigarette smoke extract. *Inhal Toxicol.* 2013;25:354–361.
91. Odum LE, et al. Electronic cigarettes: do they have a role in smoking cessation? *J Pharm Pract.* 2012;25:611–614.
92. Callahan-Lyon P. Electronic cigarettes: human health effects. *Tobacco Control.* 2014;23: ii36.
93. Chen L and Husten CG. Introduction to tobacco control supplement. *Tobacco Control.* 2014;23:ii1.
94. Grana R, et al. E-cigarettes: A scientific review. *Circulation.* 2014;129:1972.
95. Seppa N. E-cigarettes don’t help smokers quit, study finds. *Science News.* 2014;185:16.
96. Czogala J, et al. Secondhand exposure to vapors from electronic cigarettes. *Nicotine & Tobacco Research.* 2014;16:655.
97. Fuoco FC, et al. Influential parameters on particle concentration and size distribution in the mainstream of e-cigarettes. *Environmental Pollution.* 2014;184:523.
98. Schober W, et al. Use of electronic cigarettes (e-cigarettes) impairs indoor air quality and increases FeNO levels of e-cigarette consumers. *International Journal of Hygiene and Environmental Health.* 2013.