

*Review Article*

## **Association between Electronic Cigarette Use & Initiation of Smoking Tobacco among Youth**

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### **ABSTRACT**

Electronic cigarettes are, globally, continuously gaining popularity among new generation. Some public health groups advocate their sale as they think they are a safer alternative than traditional cigarettes while others oppose as they think that electronic cigarettes affect the behaviour of non - smoking youth. As they do not have tobacco smell it becomes easy for the young people, even in home, to use them. Unlike traditional cigarettes, electronic cigarettes have sleek and attractive packing and designs which make them, certainly, make them more attractive.

**Keywords:** Electronic cigarette; Combustible cigarette; tobacco smoke.

### **INTRODUCTION**

Across many countries, electronic cigarettes are continuously gaining popularity. They are battery-operated nicotine delivery systems and do not emit smoke but vapour. Recently, there has been a high increase in sale of electronic cigarette in many countries. Many opinions exist for their use. One of the reasons for allowing electronic cigarettes in the market is the scientific consensus that electronic cigarettes are less harmful than tobacco smoke and will help people to quit tobacco smoking. However, many adolescents who have never used tobacco cigarettes are using the electronic cigarette. Therefore, it becomes crucial to know the probable effect of electronic cigarette use on initiation of combustible tobacco use by youth. The review aims to find any association between baseline electronic cigarette use by the adolescents and their future combustible tobacco use.

### **MATERIALS AND METHODS**

In order to review concise and focussed data relevant to current scenario of electronic cigarette, only articles based on recent studies were selected. Words (electronic cigarette OR Electronic nicotine delivery system OR e cigarette) and (adolescents OR youth OR young people OR college students) and (smoking OR cigarette smoking OR tobacco use disorder OR behaviour) were combined and searched on Medline and Pub Med.

Only the United States based studies were chosen. Also, the studies done at different places in the United States were selected to minimize any local area/community effect on predicting the association between the use of electronic cigarette and future traditional smoking in adolescents. All articles selected discussed the studies: (i) were started in and after 2010 and have completed now (ii) included the adolescents who used and not used electronic cigarette at baseline and later followed or not followed tobacco smoking; (iii) quantitatively compared the association

of presence or absence of electronic cigarette use at baseline by adolescents with future traditional smoking; (v) conducted on individuals above 14 years but below 26 years or school/college students (iv) were conducted under individual's natural environment.

## RESULTS

Five articles were selected from online databases and one article selected from chaining the references.

## DISCUSSION

All six longitudinal studies completed the survey on about 123,410 adolescents of which about 8227 participants were baseline never tobacco using electronic cigarette users. Primack et al. 2015 [1] reported that the odds for future tobacco smoking among electronic cigarette baseline adolescents were more than 8 times the odds for future tobacco smoking among the adolescents who did not use the electronic cigarette. Electronic cigarettes can act as a slow nicotine starter by allowing the user to slowly increase his nicotine taking capacity finally switching to traditional cigarettes. Further, flavored electronic cigarettes attract more of young people but, as the conclusion was made on 11 of 16 baseline electronic cigarette users who later did tobacco smoking, the study lacks statistical power for making any significant conclusion for public health. However, the study is strengthened sharing the similar conclusion with Wills et al. 2015. [2] This study included up to 888 of 2338 high school students who used electronic cigarette at baseline. Unlike other studies, this study concluded the behavioral costs for using electronic cigarettes in adolescents. The study's intra - subject variability, due to dissimilar responses of the same question at subsequent follow-ups of a single respondent on usage of electronic cigarette at baseline, and the 67% and 70 % of response in follow ups questionnaires limits the study to be considered for advocating any single conclusion. Contrary

to this, Leventhal et al. 2015 [3] reported 96.6% of the response. The study gets further strength as it conducted three waves of classroom survey question, unlike other studies which included 2 waves, getting more repeated measures of tobacco smoke and electronic cigarette use, in 1.5 years of time. The study claimed that not only baseline electronic cigarette users use combustible tobacco in future, but the baseline tobacco smokers also use the electronic cigarette in future. Thus, the study stands alone in this review with the conclusion of bidirectional association between baseline use of tobacco smoking or electronic cigarette. The study also agrees with the study done by Wills et al. 2015 [2] claiming that flavored electronic cigarettes certainly attract more youth putting them at higher risk to use tobacco smoke but, as the odds ratio varies from 1.75 to 2.96, the extent of increase in risk is not clear.

Cardenas et al. 2016, [4] by doing a detailed comparison by dividing the participants into age groups, has given a relatively better estimate of the amount of increase in the risk of tobacco smoke for baseline electronic cigarette users. The study proves that the risk for use of combustible tobacco use increases with the lesser age an individual uses electronic cigarette at baseline. Further, the study correlates its findings with other studies by estimating the adjusted odds of tobacco smoke by baseline electronic cigarette users as 1.7 times more than the odds of tobacco smoking by not - nicotine baseline users. The study complements the view of Laventhal et al. 2015 [3] that says the electronic cigarette act as a gateway for future tobacco smoke for youth and hence considering 'electronic nicotine delivery system' users as the separate population which is much more likely to do tobacco smoke than non - users. However, neither of the studies describes the temporality between electronic cigarette and tobacco smoke use but does only throw light on association between them.

Trimis et al. 2016 <sup>[5]</sup> compared an equal number of participants of baseline electronic cigarette users and those who never used nicotine at baseline. Those who reported e-cigarette use had more than six times the odds of initiating cigarette use as never e-cigarette/nicotine users. The study also found that electronic cigarette use can promote cigarette smoking even in low-risk group individuals suggesting again as electronic cigarette users as the separate population, similar to study done by Laventhal et al. 2015, <sup>[3]</sup> more likely to tobacco smoke in future. The study, up to some extent, disagrees with the study done by Cardenas et al. 2016 <sup>[4]</sup> which says that risk for using combustible tobacco increases with the young age of the individual using electronic cigarette at baseline. Though it was found that 36% of baseline electronic cigarette users do tobacco smoke than 6% of smokers who did not do baseline electronic cigarette use, it gives a probability, unlike other studies, that electronic cigarette acts as a marker for those individuals who would smoke in future even if electronic cigarette was not used.

Bunnel et al.2014 <sup>[6]</sup> analyzed a three-year survey and concluded the odds for using combustible tobacco for electronic cigarette users was 1.7 times than that in never users. This study was distinct in the way that it compared the risk for future traditional smoke among three groups of people, electronic cigarette at baseline, combustible tobacco at baseline, and non - combustible tobacco at baseline and found that maximum number of, 43.9%, of baseline electronic cigarette users do tobacco smoke in future when compared to combustible (41.4%) and non-combustible (38.3%) baseline tobacco users who do traditional smoking in future. Though with many interesting findings, the study fails to establish the temporality between electronic cigarette use and tobacco smoking.

## CONCLUSION

All the studies have calculated the adjusted odds ratio which gives risk

estimate, unaffected by age, sex, demography, maternal tobacco use level and ethnicity, for future use of combustible tobacco by both electronic cigarette baseline users and non - users. It is clear that there is a significant association between baseline electronic cigarette usage and use of combustible tobacco by adolescents but the level of risk is still unclear. Higher cigarette smoking frequency in non-baseline electronic cigarette user group than baseline electronic cigarette users can be more harmful but none of the studies compare the frequency of smoking in both the groups. Primack et al. 2015 <sup>[1]</sup> and Wills et al. 2015 <sup>[2]</sup> showed that flavoring increases the number of adolescents attracted towards electronic cigarettes and makes the lungs more adapted to inhale higher concentration of nicotine, no study has compared the effect of different flavors and nicotine content of electronic cigarette on traditional cigarette use. One view says that baseline electronic cigarette users are a separate population who are at utmost risk of using combustible tobacco in future and therefore electronic cigarette should be banned from making this population grow in number. While, other view says that electronic cigarettes mark people who will use combustible tobacco even if they do not get electronic cigarette at baseline. It is unlikely that both of these views coexist and hence a further research is required to select the correct view. Need not to say, all the studies agree on the significant association between electronic cigarette and tobacco smoke use among the adolescents and hence the governments should consider the future consequences before promoting electronic cigarettes as a safer alternatives for tobacco smokers.

## REFERENCES

1. Primack A, B, Soneji S, Stoolmiller M, Fine J,M, Sargent J,D. Progression to traditional cigarette smoking after electronic cigarette use among US adolescents and young adults. JAMA Pediatrics. 2015; 169(11).

2. Wills A, Thomas, Knight R, Sargent D, James, Gibbons X, Frederick, Pagano I, Williams J, Rebecca. Longitudinal study of e-cigarette use and onset of cigarette smoking among high school students in Hawaii. *Tobacco Control*. 2016.
3. Leventhal M, Adam, Strong R, David, Kirkpatrick G, Matthew, et al. Association of electronic cigarette use with initiation of combustible tobacco product smoking in early adolescence. *JAMA*. 2015; 314(7).
4. Cardenas M, Victor, Evans L, Victoria, Balamurugan A, Faramawi F, Mohammed, Delongchamp R, Robert, Wheeler G,J. Use of electronic nicotine delivery systems and recent initiation of smoking among US youth. *International Journal of Public Health*. 2016; 61(2):237-241.
5. Trimis-Barrington L, Jessica, Urman R, Berhane K, et al. E-cigarettes and future cigarette use. *Pediatrics* 2016; 138(1).
6. Bunnell E, Rebecca, Agaku T, Israel, Arrazola A, Rene, et al. Intentions to smoke cigarettes among never-smoking US middle and high school electronic cigarette users: National youth tobacco survey, 2011-2013. *Themed Issue on Electronic Nicotine Delivery Devices*. 2014; 17(2).

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