Is it Really that Cool to JUUL: Cross-Sectional Study of Cotinine, Cytokine Levels and Nicotine Dependence in the Emerging Age Population

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SIGNIFICANCE

- Electronic Nicotine Delivery Systems (ENDS) usage has dramatically increased in the emerging adult population.
- There is a prevalent misconception that ENDS are safer than traditional cigarettes (Martinease, Bowersick & Wheldon, 2018).
- There is not a set amount of nicotine in all ENDS products, and consumers sometimes do not know how much nicotine they are ingesting (Cobb, Hendricks & Eissenber, 2015).
- The flavors in ENDS have been linked to an increased risk for developing bronchiolitis obliterans (Vincent, Potts, Durbin, Moore & Eleyes, 2018).
- The Surgeon General has declared [ENDS] use among young people “a major public health concern” (Truth Initiative, 2018).

PURPOSE

The purpose of this pilot study was to examine differences in nicotine dependence and psychosocial factors in a sample of undergraduate students at the University of Kentucky.

METHODS

Data Collection
- Data was collected at one time at three different on-campus meetings over one month.
- Penn State Electronic Cigarette Dependency Index (PSECDI) was administered to evaluate nicotine dependence.
- Salimetrics™ passive drool containers were used to validate oral cotinine level (>100 ng/mL to confirm smoking status), and measure cytokine levels.
- Participants self-reported their measures of smoking behavior and current levels of anxiety and depression through the use of a survey derived from current and relevant literature:
  - Generalized Anxiety Disorder 7 (GAD-7)
  - Patient Health Questionnaire 9 (PHQ-9)

Analysis
- Descriptive statistics, including mean and standard deviation or frequency distribution were used to summarize study variables.
- All data analysis conducted used SAS version 9.4 with α = .05.

RESULTS

- Overall, participants reported a low dependence to nicotine based on PSECDI scores.
- Analysis of differences between ENDS and Non-ENDS users revealed:
  - Higher mean depression and anxiety scores among ENDS users compared to non-ENDS users (Figure 1).
  - Increased occurrence of additional substance use (tobacco products, illicit drugs) within the last thirty days among ENDS users compared to non-ENDS users.

METHODS

- Sixty students enrolled in the study (Table 1):
  - 33 ENDS users
  - 30 non-ENDS users
  - 94% of participants were white

- 76.47% reported moderate to extremely strong nicotine cravings.
- 55% cited difficulty to quit as a reason for continued ENDS use.
- 48% of study participants did not consider using an ENDS to be a form of smoking (Figure 2).

- 63% of study participants did not consider using an ENDS to be a form of smoking (Figure 2).

- Examination of differences in nicotine dependence between genders revealed no statistically significant differences.
- Despite low dependence scores, current ENDS users reported difficulty to quit ENDS use and strong nicotine cravings.
- Alarming, more than 40% of current ENDS users did not know the amount of nicotine found in their device, which underscores the concerns about the health risk associated with ENDS use.

DISCUSSION

- Salivary cotinine, cytokine levels (Interleukin (IL), 1 a, 1 b, 246810, TNF a, CRP, MMP8), and patterns of respiratory health between ENDS users and Non-ENDS users in this emerging adult population are currently undergoing analysis by our team.

- Both

ACKNOWLEDGEMENTS

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- References available upon request.

Table 1. Demographic characteristics of study sample (N=60)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean (SD); range or n(%)</th>
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</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 (47.62)</td>
</tr>
<tr>
<td>Female</td>
<td>33 (52.38)</td>
</tr>
<tr>
<td>Ethnicity</td>
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<tr>
<td>White (Caucasian)</td>
<td>59 (93.95%)</td>
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<tr>
<td>African American</td>
<td>3 (4.76%)</td>
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<td>Hispanic</td>
<td>1 (1.59%)</td>
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<td>Grade in School</td>
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<tr>
<td>Freshman</td>
<td>12 (19.00%)</td>
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<tr>
<td>Sophomore</td>
<td>18 (28.57%)</td>
</tr>
<tr>
<td>Junior</td>
<td>19 (30.16%)</td>
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<tr>
<td>Senior</td>
<td>13 (20.63%)</td>
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<tr>
<td>Fifth Year</td>
<td>1 (2.59%)</td>
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</table>

FIGURE 1. Comparison of depression scores (PHQ-9) between ENDS and non-ENDS users