



Perceived risk and benefits of e-cigarette use among college students



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HIGHLIGHTS

- E-cigarette use is growing in popularity among college students.
- This study explores the perceived risks and benefits of e-cigs among this population.
- The development of the Risks and Benefits of E-cigarettes (RABE), as a reliable measure is discussed.

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ABSTRACT

Recent data demonstrates that the use of e-cigarettes is growing, especially among college students and young adults. This trend is increasingly problematic, as many of these individuals report never using traditional tobacco cigarettes, but nevertheless are using e-cigarettes. The present study sought to develop the Risks and Benefits of E-cigarettes (RABE) questionnaire to assess the perceptions about e-cigarette use among college students. College students ($N = 734$) completed the RABE via online survey. Principal components analysis yielded two reliable scales representing perceptions about e-cigarette use. Based on the two-factor solution, subscales were named according to item content. The resulting 30 items demonstrated excellent internal consistency (Risks scale $\alpha = 0.92$; Benefits scale $\alpha = 0.89$). Subsequent confirmatory factor analysis generally supported the 2-factor structure. As an initial measure of construct validity, scale scores were compared across smoking status groups. Smoking status groups were defined by the following: “e-cigarette users” were current daily users of e-cigarettes, “conventional smokers” were daily traditional cigarette users, and “dual users” were individuals who used both e-cigarettes and traditional cigarettes daily. Scale scores for perceived Benefits of e-cigarette use differed significantly across groups ($p < 0.001$), whereby students who reported using e-cigarettes or traditional cigarettes reported benefits associated with e-cigarette use. Scale scores for perceived Risks of e-cigarette use across smoking status groups did not significantly differ. The present results indicate that the RABE is a reliable instrument to measure college student’s perceived risks and benefits of e-cigarettes.

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1. Introduction

Tobacco use remains the leading cause of preventable death and disease in the United States. In 2010, the Surgeon General reported that >440,000 people die annually from smoking-related deaths (Centers for Disease Control and Prevention [CDC], 2012a; United States Department of Health & Human Services [USDHHS], 2010). Given the high rates of smoking-related deaths, electronic cigarettes (e-cigarettes) have been promoted as an aid to smoking cessation and research demonstrates that many adult who endorse e-cigarette use are utilizing the devices to quit smoking (Goniewicz, Lingas, & Hajek, 2012). These devices, also known as hookah pens, e-hookahs, or vape pipes, are battery-powered, nicotine delivery systems in

which nicotine and flavors are heated to form an aerosol that is inhaled. This form of nicotine inhalation is also referred to as “vaping.” e-cigarettes may be disposable, rechargeable (e.g., lithium batteries), or refillable (i.e., liquid cartridges; Grana, Benowitz, & Glantz, 2013; Grana, Benowitz, & Glantz, 2014). Although e-cigarettes have been shown to reduce craving and nicotine withdrawal symptoms, their efficacy as a long-term aid to smoking cessation has yet to be determined (Schaller et al., 2013). Research to date has failed to support the role of e-cigarettes as an effective cessation tool. For example, Grana et al. (2014) found that e-cigarette use by smokers was not associated with reduction or cessation rates in regular smoking one year later (Grana et al., 2014). This is disappointing given that 85% of adult e-cigarette users report explicitly using e-cigarettes to quit smoking (Grana et al., 2013; Grana et al., 2014).

Recent data indicate that while rates of daily cigarette smoking among youths and young adults (including college students) are declining, e-cigarette use is growing in popularity among these populations

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(Camenga et al., 2014; CDC, 2011; CDC, 2012b; CDC, 2013). This is especially true among college students, who are more likely to report e-cigarette use than other age groups. Recent research reports that 45% of undergraduate students (ages 18–25) endorsed using an e-cigarette at least once within their lifetime and 12% of these students reported use within the past month (Allem, Forster, Neiberger, & Unger, 2015). Similarly, Choi and Forster (2013) report that among a large cohort of young adults in the United States, 69.9% (aged 20–28 years old) were aware of e-cigarettes, 7.0% reported trying an e-cigarette at least once in his/her lifetime (i.e., ever use) and 1.2% reported current e-cigarette use (Choi & Forster, 2013). The gaining popularity of e-cigarettes among young adults is further supported by a recent Internet survey among college students, in which 4.9% of participants reported ever use and 1.9% reported current use (Sutfin, McCoy, Morrell, Hoepfner, & Wolfson, 2013). A second Internet survey of college students reported that almost all students participating in the survey were aware of e-cigarettes (95.5%), and approximately 30% reported previously trying an e-cigarette at least once (Saddleson et al., 2015). Twelve percent of young adult e-cigarettes users reported never smoking traditional tobacco cigarettes. In addition, these users frequently report that their e-cigarette use is not related to a cessation attempt (Sutfin et al., 2013). This is concerning as these preliminary data suggest that e-cigarette users, who are not traditional smokers, are inhaling nicotine; this may lead to smoking traditional cigarettes, creating a potential public health concern (Choi & Forster, 2013; Pearson, Richardson, Niaura, Vallone, & Abrams, 2012; Sutfin et al., 2013). In fact, research has shown that young adolescents who have used e-cigarettes were more likely than non-using peers to report use of traditional tobacco products over the next year (Leventhal et al., 2015).

1.1. Perceptions of e-cigarettes in college-aged youths

Initial data suggest that college students endorse views that e-cigarettes are safe alternatives to traditional tobacco cigarettes, as well as report high acceptance levels for public e-cigarette use (Chapman & Wu, 2014; Goniewicz & Zielinska-Danch, 2012; Trumbo & Harper, 2013). There is evidence that college students perceive e-cigarettes to be helpful in aiding in cessation attempts, despite not using them to stop smoking (Choi & Forster, 2013; Sutfin et al., 2013). Additionally, this population tends to view e-cigarette use as less harmful and less addictive than traditional cigarettes (Choi & Forster, 2013).

Trumbo and Harper (2013) surveyed college students and found that 71% of participants were aware of e-cigarettes and that this awareness was associated with increased acceptance of using tobacco products (most notably e-cigarettes) in public, as well as social normative pressure surrounding e-cigarettes (Trumbo & Harper, 2013). These individuals viewed e-cigarette devices as a favorable innovation, leading one to question the role of curiosity, which may contribute to experimentation with e-cigarette use in this population (Trumbo & Harper, 2013). Evidence indicates that individuals who agree that e-cigarettes aid in smoking cessation are more likely to experiment and try the “vaping” products (Choi & Forster, 2013). Perceptions of e-cigarettes among college students are proposed to relate to their lack of knowledge regarding health consequences and negative effects of e-cigarettes (Saddleson et al., 2015).

In regard to e-cigarettes, college students endorse positive outcome expectancies for e-cigarettes. This is similar to previous research among college student traditional cigarette users, who associated smoking traditional cigarettes with positive expectancies and inversely related to negative expectancies (Brandon & Baker, 1991; Pokhrel, Little, Fagan, Muranaka, & Herzog, 2014). Positive expectancies are often associated with intentions to use e-cigarettes in the future (Pokhrel et al., 2014). These results are similar to expectancies observed in adult e-cigarette users who report that e-cigarettes use is less likely to cause negative social impressions, increases social experiences, and is less harmful than traditional cigarettes (Harrell et al., 2015; Pearson et al., 2012).

This evidence is worrisome as research has established that college students who report high ratings of positive expectancies and acceptance are more likely to report e-cigarette use within the past month, potentially placing the student at risk for beginning to smoke traditional cigarettes (Pokhrel et al., 2014; Saddleson et al., 2015). However, while preliminary research has begun to evaluate outcome expectancies of e-cigarettes in college students, (Pokhrel et al., 2014) to date, no assessment tool has been developed and validated to identify the perceptions and knowledge surrounding the use of these devices among young adults.

1.2. The current study

The current study aimed to identify perceptions regarding the safety and usefulness of e-cigarettes among college-aged students and details the development of a questionnaire for assessing these perceptions. In addition, the current study sought to identify dimensions of these domains regarding e-cigarette use via factor analytic procedures. It was hypothesized that participants would view e-cigarette use as safe and beneficial, especially those participants who endorsed current use of e-cigarettes. We also predicted that perceptions of risk associated with e-cigarette use would be lower among participants endorsing current use of e-cigarettes.

2. Methods and materials

2.1. Participants

Undergraduate students at a large southern university ($N = 734$) were recruited through the Department of Psychology undergraduate research participant pool and received extra credit in their courses for participation in the study. Inclusion criteria were being at least 18 years of age and a current undergraduate student enrolled at the university for the semester.

2.2. Instruments

2.2.1. Demographic questionnaire

This questionnaire assessed the participant demographics, age, gender, ethnicity, education and marital status.

2.2.2. Smoking status questionnaire (SSQ)

This form assessed smoking-related variables, such as current and past smoking patterns and previous smoking cessation attempts. It included the Fagerström Test for Nicotine Dependence (FTND) to assess nicotine dependence level (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Smoking status group was determined via information collected in the SSQ, such that e-cigarette users (“e-cig users”) were defined as currently daily use of e-cigarettes and “conventional smokers” were defined as individuals who reported daily use of traditional cigarettes. “Dual users” were defined as individuals who reported daily use of both e-cigarettes and traditional cigarettes.

2.2.3. Risks and benefits of e-cigarettes (RABE)-draft form

The authors and other members of the research team reviewed recent literature detailing the overall background information and perceptions regarding positive and negative health consequences of the general population and youths regarding e-cigarette use. Research reviewed focused upon comprehensive background knowledge from leading research teams (e.g., Grana et al., 2013), as well as research studies, surveys and reviews regarding e-cigarette awareness, prevalence, attitudes and perceptions of health consequences/benefits (e.g., Choi & Forster, 2013; Chapman & Wu, 2014; Trumbo & Harper, 2013; Saddleson et al., 2015). This review generated 44 items reflecting potential beliefs, attitudes, and background information (reflecting knowledge of e-cigarettes) surrounding e-

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