

## Smoke and Mirrors: How Much Do We Know? An Assessment of Graduate Nursing Students' Knowledge of Tobacco and E-Cigarette Use

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### ABSTRACT

**Background:** Research suggests that there is a gap in knowledge of healthcare workers and graduate healthcare students on tobacco and e-cigarette use (Franks, Hawes, McCain, & Payakachat, 2017). These products are proving to be more addictive and contain more nicotine than traditional cigarette products. Furthermore, there is a difference in the way providers must assess patients for tobacco versus electronic cigarette (e-cigarette) use, as language plays an important role in how individuals identify as e-cigarette or traditional cigarette users (Young-Wolff et al., 2017). Although these products are new and long-term effects remain unknown, evidence suggests these products do affect overall health.

**Aim:** The objective of this study is to assess the knowledge of graduate nursing students at Fairfield University on tobacco and e-cigarette use.

**Methods:** Sixty-five participants were recruited from the Fairfield University graduate nursing program. Students completed a consent form followed by a pretest that contained 10 survey questions in a true or false format. An educational session was then conducted and followed by the same survey as a posttest. Data was analyzed with SPSS.

**Results:** The mean pretest score was 61.8% and the mean posttest score was 78.8%. A paired sample t-test revealed a p-value of <0.00.

**Conclusion:** This project was statistically significant in educating graduate nursing students on tobacco and e-cigarette use. More education is needed at the graduate level on this topic.

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Tobacco use remains the number one preventable cause of death worldwide (WHO, 2019). Smokeless tobacco, including electronic cigarettes (e-cigarettes), are battery-operated products that vaporize highly addictive nicotine, flavor, and other chemicals. E-cigarettes can be battery operated or rechargeable, and are also reusable (FDA, 2020). Currently, there are no federal regulations set for device ingredients or content and while they do not contain tobacco, current products include a variety of toxic chemicals including: heavy metals such as cadmium, lead, nickel, tin and copper; and high amounts of nicotine (CDC, 2016). Recent studies (Blount et al., 2020) demonstrate a concerning relationship between Vitamin E acetate and carbonyl compounds created from aerosol formed by e-cigarettes in the setting of acute lung injuries. The 2019 National Youth Tobacco Survey showed 27.5% of high school students had



vaped in the last 30 days, compared to only 11% in 2017, and middle school use was reported at 10.5%, compared to 0.6% in 2011 (Cullen et al., 2019). The purpose of this educational intervention is to assess the level of knowledge and educate rising advanced healthcare providers on best practices in the primary prevention of smokeless tobacco products. Educating healthcare providers on tobacco and e-cigarette use in addition to the importance of screening may decrease the use of these products; thus decreasing the public health risks.

## METHODS

Participants were recruited from the Fairfield University graduate nursing program. Following IRB approval from the study team's institution, the graduate level nursing students who chose to voluntarily participate read and completed an informed consent. After consent, a 10-question pretest survey was administered through secure survey software. The survey was adapted from a study completed at The University of Arkansas for Medical Sciences College of Pharmacy with permission from the author (Franks et al., 2017). If students chose not to participate, they were excused from the classroom and told participation in this study would have no effect on class grade. Students were given handouts with custom QR codes linked directly to the survey, making the tool easily accessible to participants. These surveys were not specifically coded to test comparative samples in the nature of protecting the identity of participants. The pretest assessed the knowledge of graduate nursing students on e-cigarette and tobacco use and the knowledge of current campus policies on this topic. After completing the pretest, participants were given a presentation on the current best practices around tobacco and e-cigarette use (Franks et al., 2017). After completion of the educational intervention, a posttest was administered, consisting of the same questions as the pretest (Table 1). All students who participated in the pretest also completed the posttest. Results were analyzed with a paired samples t-test on SPSS version 25. A statistician was not consulted, and SPSS was run by the DNP student. Criteria for significance was set at  $p = <0.05$ .

Table 1.

<i>Question</i>	<i>True/False</i>
Typically, e-cigarettes are reusable.	True
Standard federal regulations are in place to restrict the use of electronic cigarettes.	False
All U.S. consumers must show proof of age when purchasing electronic cigarettes.	False
E-cigarettes are battery-powered devices that do not burn tobacco.	True
The total number of non-smokers who have started vaping/"smoking" e-cigarettes in the past 5 years has decreased.	False
In general, overall cost of e-cigarettes is less than tobacco cigarettes.	True
E-cigarettes are less addictive than tobacco cigarettes.	False
E-cigarettes are a source of second hand exposure to nicotine.	True
There is no difference in the screening of e-cigarettes versus traditional cigarettes.	False
There is sufficient data on the safety of e-cigarette use.	True

## RESULTS

A total of 65 participants received the educational intervention. All participants who completed the pretest also completed the posttest, yielding a 100% response rate. A paired samples t-test was conducted to determine if a one-

time educational session on tobacco and e-cigarette use improved knowledge on this topic. The mean of average total scores yielded a mean of -1.69231, which can be interpreted as a 17% increase in posttest scores compared to pretest scores. The total average pretest score was 61.8%, (6.18, SD 1.45658) The total average post-test score was 78.7%, (7.8769, SD 1.03844). A two-tailed t-test revealed a significance of 0.000000. With criteria set for  $p = <0.05$ , this t-test was found to be statistically significant (Table 2). These results support the directional hypothesis, “There will be an increase in knowledge amongst graduate students after an educational session on tobacco and e-cigarette use is provided.”

Table 2.

*Table 2: Paired Samples T-Test*

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pretest/Posttest Total Average Score	-1.69231	1.74931	0.21698	-7.8	64	0.000000

## DISCUSSION

This intervention demonstrated a statistical significance in educating graduate nursing students on tobacco and e-cigarette use. When choosing a sample group for this study, graduate nursing students were of interest given that they are both future healthcare providers, and also underrepresented in the literature. A study by Frank et al. (2017) was the first to evaluate graduate students on tobacco and e-cigarette use knowledge. A limitation to this study is the abbreviated amount of time between administration of the pre and post survey. Given that this study was done during lecture time, it was most effective to administer both the pre and posttests in the same session; however, a more accurate representation of knowledge gained would be measured by giving the posttest survey at a later date. Additional limitations include a non-diverse sample of participants, as all students were of the same approximate age and had little variations in race, ethnicity, or socioeconomic backgrounds.

## CONCLUSION

Based on the results of this intervention, more graduate students and healthcare providers should be educated on tobacco and e-cigarette use as it is a vital component of patient care and assessment. There was no evidence in the research to suggest that education on this topic is provided in graduate courses. This study recommends the inclusion of targeted e-cigarette education into the graduate nursing curriculum given the high risks associated with these products. Properly educating healthcare providers will enable them to screen patients effectively and educate patients on the overall effects of these products, all the while using the correct language and communication techniques. Given the lack of federal regulations, e-cigarettes are not fully understood by either the experts or the general public. Emerging research indicates a lack of awareness of the dangers associated with these products for all age groups. Understanding how to screen, educate, and prevent the dangers of these products is critical to the care of the patient and overall public health. By including this topic in the graduate nursing curriculum, healthcare providers will have the increased knowledge needed to best prevent disease and apply evidence-based outcomes.

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